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ABSTRACT

A study tracing the United States economy over the last 40 years reports the skills needed in the changing economy around the turn of the 21st century. Data sources were the March Annual Demographic files of the Current Population Survey for 1970, 1980, 1990, and 1996, and the Public Microdata Sample of the 1960 Census. The study notes the rise of the premium in wages for college graduates and the decline in real earning for all high school graduates, especially males. Some highlights of the findings include the following: (1) office work dominates the U.S. economy; (2) office professionals outnumber clerical workers; (3) the wages for less-skilled counter workers have dropped and are continuing to drop; (4) high-skilled services (e.g., education, health care, police, and firefighters) have become more important components of the economy); (5) most office jobs fall into the "elite" and "good" jobs categories; (6) the status of female workers has improved in the new office economy; (7) the office economy has sharply increased wages and workplace opportunities for African Americans; (8) despite advances for females and African Americans, a substantial racial and gender gap remains between those groups and white males; and (9) access to the office, not access to new technology, has become the major source of increasing earning inequality. Implications of the study's findings include that it is high-level office workers (managers, lawyers, doctors, accountants), not "high tech" workers (computer technicians, engineers), whose incomes have risen the fastest and that "management" is more crucial than ever and more rewarded. The study raises questions about the structure of organizations, the role of unions and government, and the future of government protection and consumers' rights. (Contains 55 references.) (KC)

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Education for What? The New Office Economy. Executive Summary [and] Technical Report Leadership Series.

Anthony P. Carnevale and Stephen J. Rose

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Leadership Series

Education For What?

The New Office Economy

Anthony P. Carnevale
Stephen J. Rose

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EDUCATION FOR WHAT? THE NEW OFFICE ECONOMY

Executive Summary

Anthony P. Carnevale
Stephen J. Rose

Educational Testing Service

Mail Stop 01-C
PRINCETON, NJ 08541
Voice (609) 734-5531
Fax (609) 734-1140

1800 K Street, NW, Suite 900
WASHINGTON, DC 20006
Voice (202) 659-8056
Fax (202) 887-0875

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Foreword

We at ETS are pleased to add this contribution to our understanding of how the modern economy works. We have been assessing the abilities of students and adults for more than 50 years and have often been asked the question — *Education for What?* This report provides some new answers to this question and should help the education community be more effective in its role of preparing citizens and workers to be full participants in America's future.

The changes in the American economy over the last several decades have been dramatic and sometimes disturbing. The news media have featured reports of stagnating family incomes, declining males' earnings, downsizing, and the difficulties experienced by displaced workers in finding comparable employment. Yet, our economy has generated over 25 million jobs since 1982, the stock market has soared, and inflation and budget deficits have all but disappeared. Further, the educational credentials of the labor force have gone up tremendously: In 1959, over half of prime-age workers had not finished high school, and only one in five had at least some postsecondary education. By 1995, only one in nine did *not* have a high school diploma — more than half had at least some college.

Few analysts have been able to integrate the good and bad news into a comprehensive story about economic change. Many people have used terms, such as "service economy" and "post-industrial society," to lament the loss of good-paying manufacturing jobs. For them, the vast majority of new jobs are low-skilled service positions that are low-paying and without a promising future. This report challenges such assertions by taking a fresh look at how the government and traditional economists classify jobs.

By focusing on what people actually *do* instead of what industry they work for (manufacturing, construction, professional services, finance, etc.), two senior members of Educational Testing Service (ETS) Office of Public Leadership, Anthony Carnevale and Stephen Rose, have developed a new functional approach that combines all the activities of administration, coordination, and promotion into a broad new category — the Office.

We have found that office workers make up 41 percent of our workforce, but account for fully half of all earnings. And these office workers hold 65 percent of all managerial and professional jobs. In other words, *the new service economy is in the office.* And the low-skilled service sector represents only one-fifth of the labor force, essentially unchanged since 1959.

I commend this report to your reading and look forward to participating in the continuing dialogue on the issues it raises.

Nancy Cole
President
Educational Testing Service

Part of a Larger Study

This executive summary is part of a larger (100-page) technical report of the same name. The precise methodology of the functional approach and the division of occupations into new categories are more thoroughly defined in the technical report. Further, the changes in all of the variables from 1959 to 1995 and the relationships between variables are detailed in greater depth.

This study is the first in a series of reports on the skill requirements needed in a changing economy. These new labor needs are based on changes in the way goods and services are produced and in the composition of consumers' final demand. In addition, advances in communication and transportation have made the world a smaller place to do business. As the global economy has grown, there has been a convergence in what consumers in different countries want and expect and a specialization of tasks and abilities in different regions. We intend to look at other advanced countries to see if the office sector is as dominant and as rapidly growing elsewhere as in the United States. Finally, we will explore the nature of careers in the Office Economy by incorporating longitudinal data and by evaluating the cognitive abilities of different types of workers.

Acknowledgments

The authors would like to thank many people for assisting in producing this report. David Wright of the Department of Sociology at Wichita State University was responsible for the programming runs that generated the raw data from Census computer tapes. This task was quite complex and required matching occupation and industry codes in different years and translating the official categories into the functional and occupational groups presented here. The final preparation of the text – editing and fact-checking – benefitted from the assistance of Marlies Dunson, June Elmore, Neal Johnson, Barbara Koeppel, Jeff Strohl, and Graham Vink.

Authors' Views

This report was written by Anthony P. Carnevale and Stephen J. Rose of Educational Testing Service Public Leadership. The views expressed in this report are those of the authors and do not necessarily reflect the views of the officers and trustees of Educational Testing Service.

Introduction

New Rules for the National Economy

What makes the new economy go?

It is not mainly the scientists, the engineers, the technicians, or the computer programmers.

It is the members of the new Office Economy—a force of 52.6 million well-educated workers—who are reengineering every industry and profession and changing the way America works, in ways great and small.

Industrial production—the former icon for U.S. power and wealth—now plays second fiddle to the new office. These middle managers, insurance agents, real estate brokers, financial planners, executive secretaries, sales representatives, accountants, lawyers, small business owners, CEOs, vice presidents, writers, clericals, editors, lobbyists, janitors, economists, and the like now make up a larger portion of the workplace (41 percent of the jobs) and earn more money (50 percent of total earnings) than any other part of the economy. Indeed, in 1995 these workers earned 47 percent more than non-office workers!

Conventional wisdom has always viewed the American economy as a pyramid with a broad, solid base of jobs in manufacturing, construction, and natural resources; where productivity is high, which supports an array of medical, personal, and financial services at the top.

In fact, the opposite has come true. The old industrial pyramid has been turned upside down. In the new economy, workers employed in a wide variety of office functions from marketing to managing and consulting are driving value added by reinventing, reorganizing, and rationalizing old industrial, natural resource, and service industries.

Science and invention win prizes, but they are not where the real action is. Making the product and delivering the service have become a simple parlor trick in the global economy—it can be done with equal ease in Chicago or Bangladesh.

The much-ballyhooed demand for "technical" skills is overstated. Such skills are a significant, but small, part of the economy. The major fields of high-earning, college-educated workers are located in business offices—e.g., managers, sales representatives, brokers, and accountants.

Sure, people who use computers make more money than people who don't. But so do people who use pens and post-its as well as those who drink latte and wear Dockers on casual Friday—because they tend to be office workers.

Many of these new high-skill positions previously were categorized under the much-reviled category known as "service workers"—a description that has become synonymous with low-skilled, dead-end jobs. But a closer examination reveals that most of these workers are, in fact, well-paid, white-collar employees.

The triumph of the office workers has significant political and social implications:

- **The office workers' mission is to rationalize production and service delivery in the interest of efficiency and accountability.** The results do not always please everyone. In health care, for example, there is a battle between doctors and administrators over who will decide which services to provide. Cost-cutting measures and the denial of coverage to high-risk groups have left many patients, especially low-income patients, without top quality care. Education might be the next candidate for rationalization; teachers, however, are likely to resist these changes as encroachments on their professional authority.
- **Unions, whose representation of the work force has been steadily declining, face a significant challenge in trying to organize this new breed of workers who are likely to have little interest in work "rules" or advancement based on seniority.** The office will be tough to organize because workers are dispersed widely throughout industries and because there is less physical, psychological, and functional separation between them and

managerial authority—the traditional nemesis of organized workers.

- **Challenges to government,** both for the amount it spends and the way it works, are likely to continue as the increasing efficiency of the Office Economy creates greater impatience with the performance of the public sector and strengthens the urge to "privatize."
- **The Office Economy seems to encourage growing earnings inequality.** In this study, jobs have been organized into three categories from the highest to the lowest paid: elite jobs, good jobs, and less-skilled jobs. Although 70 percent of prime-age American workers could be considered to have elite or good jobs, mostly in office settings, the outlook for the remaining 30 percent, mostly outside the office, is grim and getting grimmer.

Understanding the dynamics of the Office Economy also helps to resolve the pessimistic and optimistic views about the American economy.

The pessimists lament the passing of America's economic golden age, between 1946 and 1973. They point to a declining manufacturing sector turning factory towns into rusting museums. They see the growth of dead-end jobs, the trade drain on good blue-collar jobs, declining wages, sluggish productivity, rising economic inequality, and downsizing—all indicators of an economy in decline, unable to generate enough jobs to support the American dream. We're in trouble, they say.

The optimists point to an unemployment rate that has fallen below 5 percent, 25 million new jobs since 1982, a federal budget deficit that has all but disappeared, virtually nonexistent inflation, and a stock market that has climbed for 15 years. We're doing pretty well, they say.

Our analysis takes neither the side of the pessimists nor the optimists. We are meliorists. We realize that the rate of economic growth has declined significantly since 1973, but it is still positive, meaning that things are improving steadily even if it is at a slow pace. The number of prime-age workers with elite or good jobs (see Box 1 for definitions) has grown to 71 percent. But for the 37 percent of males in good jobs, the average pay is down 6 percent from $38,300 in 1979 to $35,800 in 1995.[1]

Box 1

Elite Jobs =

Managers and professionals

Good Jobs =

Supervisors, craft workers, technicians, clerical workers, police, and firefighters

Less-Skilled Jobs =

Operatives, salesclerks, service workers, farm laborers

So, the new Office Economy has delivered jobs and reasonable pay for most Americans. It has been especially beneficial to females who were underrepresented in the manufacturing economy. Females' earnings still trail males', but their prospects keep improving. However, there's a catch: to share in this prosperity, a person needs an education beyond high school.

It is no accident that the educational achievements of the labor force have risen dramatically. As recently as 1960, over half of prime-age workers (ages 30 to 59)[2] had not finished high school; fewer than one in 10 had received a bachelor's degree. Today, only 11 percent have not finished high school or received a General Equivalency Degree (GED); 28 percent have at least a bachelor's degree; and an additional 28 percent have at least some postsecondary education.

The supply of educated workers is growing fast, but the demand for them is growing even faster. Even as the labor force has become more educated, the relative wage premium of college graduates

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Box 2

1995 Earnings and Employment of Prime-Age Workers

Job Characterization	Earnings		Employment (in millions)		
	Male	Female	Male	Female	Total Jobs
Elite	$58,600	$33,700	14.2	13.2	27.4
Good	$35,800	$21,400	15.9	14.7	30.6
Less-Skilled	$24,000	$13,000	12.8	11.0	23.8
All Jobs	$39,800	$23,200	42.9	38.9	81.8

over those with only a high school diploma has risen sharply. In 1979, prime-age male high school graduates earned an average of $37,800, while those with bachelor's degrees earned $53,600, or 42 percent more. By 1995, earnings for high school graduates dropped 18 percent to $31,000 (in constant dollars), while those of college graduates increased by 10 percent to $58,700. Thus, the premium for a bachelor's degree over a high school diploma rose to 89 percent.[3]

Among female workers, earnings levels rose for all those who received at least a high school diploma. The pay gap between those with college degrees and those with only high school diplomas, however, was higher in 1995 than in 1979. In 1979, females with a high school diploma earned $16,400, while those with bachelor's degrees earned $25,500, or 56 percent more. In 1995, the respective pay levels were $18,200 and $34,000, or a pay difference of 87 percent.

Some highlights of this report:

1. **Office work dominates the U.S. economy.** This sector has become the dominant feature of our economy, employing 41 percent of all workers, paying the highest salaries, growing the fastest, employing over one-half of all college graduates, and capturing 50 percent of all earnings. Office workers now earn 47 percent more than non-office workers.

2. **Office professionals outnumber clerical workers.** The traditional view of an office is a workplace dominated numerically by secretaries and other support personnel. But in today's Office Economy, business professionals—accountants, managers, sales representatives, and brokers—are the largest component, accounting for 44 percent of office jobs.

3. **As the Office Economy has risen, the industrial economy has fallen.** In 1959, one-third of workers were employed in industrial production, and they accounted for 37 percent of all earnings. By 1995, both of these ratios had fallen to 19 percent. This means that the factory trailed the office by 21 percentage points in terms of employment and by 31 percentage points in terms of total earnings.[4]

4. **The United States has not been a raw materials producing country for a long time.** Only 5 percent of the workforce was in these activities in 1959, with this figure dropping to 2 percent in 1995.

5. **For less-skilled counter workers, the skies are already dark, and the forecast is no brighter.** More of them are working part-time, and their earnings have been dropping (in constant dollars) for over 30 years. The good news is that the share of low-wage service jobs in the economy has remained constant at approximately one-fifth of the total workforce, puncturing the myth that the United States is becoming a nation of minimum-wage clerks, cooks, and hamburger flippers.

6. **High-skilled services (e.g., education, health care, police, and firefighters) have become more important components of our economy.** From 1959 to 1969, their employment share jumped from 11 to 16 percent and then stabilized. Their pay, however, has continued to increase, and now total earnings in these activities almost equal those of the entire industrial sector.

7. **As the education of the workforce has risen, we have seen a decline in the less-skilled jobs offset by an increase in the elite jobs.** In 1959, 47 percent of workers were in less-skilled jobs, falling to 36 percent in 1995. This loss was offset by a gain in elite jobs from 17 to 28 percent. Somewhat surprisingly, the share of good jobs remained constant at 36 percent.

8. **Most office jobs fall into the elite and good categories.** The majority of elite jobs are based in the office (73 percent for males and 53 percent for females). The office also is the location of many good jobs (71 percent for females and 38 percent for males).

9. **Education continues to prepare people for elite jobs, especially in the office.** Over the entire 36-year-period, about 75 percent of college-educated workers held elite jobs. The increased availability of college-educated workers changed the nature of office employment as the share of elite jobs within this sector grew from 31 percent in 1959 to 44 percent in 1995. Correspondingly, the share of college-educated males who went to work in the office sector grew from 50 to 60 percent.

10. **Males without any postsecondary education face tough times.** Those with high school diplomas have seen their access to elite jobs fall along with their earnings in good and less-skilled jobs. Consequently, their earnings in 1995 were 18 percent below their level in 1979. For those without high school diplomas, their earnings dropped 25 percent and were below their earnings level in 1959.

11. **Males with some college are caught in the middle.** As the number with bachelor's degrees increased and as the opportunities for females grew, the share of males with some college in elite jobs and in office employment declined. As a direct result, their earnings fell by 9 percent from 1979 to 1995. However, in comparison with males who have only a high school education, the earnings advantage of males with some college increased from 10 percent in 1979 to 22 percent in 1995.

12. **The status of female workers has improved in the new Office Economy.** In 1959, only 4 percent of prime-age female workers had jobs as business managers and professionals; by 1995, this figure had risen to 15 percent. Up until 1969, college-educated females were mostly employed in the nursing and teaching fields; by 1995, as many females were employed in office jobs as in health and education. As more career opportunities have opened up for females, their pay has increased accordingly. For example, the paychecks of female office workers with college degrees have almost doubled since 1959; the earnings of females with some college increased 20 percent over this time period.

13. **The Office Economy has sharply increased wages and workplace opportunities for African Americans.** In 1959, college-educated Blacks were almost entirely employed in education and health care. Since 1969, numerous office professional and managerial jobs opened to them. In 1959, 77 percent of Black male workers and 83 percent of Black female workers were primarily in less-skilled jobs; only 14 percent of Black male workers and 10 percent of Black female workers were in the office sector. By 1995, only 50 percent of Black males and 42 percent of Black females were in less-skilled jobs, and access to office jobs rose to 31 percent of Black males and 40 percent of Black females. Only 4 percent of Black males and 8 percent of Black females occupied elite jobs in 1959; these figures increased to 17 percent and 23 percent, respectively, in 1995.

14. **Despite these economic advances for females and African Americans, a substantial racial and gender gap remains between those groups and White males.** Males still earn, on average, 72 percent more than females every year. And White males with bachelor's degrees earned 34 percent more than Black males with the same level of education in 1995—a gap that is *larger* than it was in 1979. Also, Black college graduates are less likely to be employed in office functions than their White counterparts.

15. **Access to the office, not access to new technology, has become the major source of increasing earnings inequality.** Those in specialized technical areas have had unremarkable earnings gains compared with office workers since 1959. With the exception of doctors, the big winners have been employed in the Office Economy. So, with half of all earnings in the economy in this sector, we find that the primary cause of increasing earnings inequality must be found in the growth in office functions and not on the basis of differences in technological expertise.

The New Office Economy

New Definitions: What Workers Actually *Do*

The Office Economy has been around for awhile, but our economic prejudices have precluded us from seeing it clearly. We are so convinced that economic activity is about producing things in mines, farms, and factories that we have relegated all other activities into a catch-all category labeled *services*.

Although many of the most-skilled and highest-paid workers are in this sector, service work usually is viewed as low paid and low skilled—the province of the workforce's poor relations, symbolized by salesclerks, janitors, waiters, and nurses' aides. Manufacturing employment is considered critical, and any decline is viewed as a cause for alarm.

This is economic history's oldest story. The hunters and gatherers surely thought the end was near when people began farming. The farmers, not to mention a lot of very smart people including Malthus and the Physiocrats, believed all wealth was derived from arable land. Naturally, they were troubled by the rise of industry and the mystical forces of technology.

The rise of services has been greeted with considerable hand-wringing because many don't see the value in work unless one can touch, see, taste, or smell its product. Factory closings are highly visible events that traumatize communities with the direct loss of many good jobs and the indirect loss of closely linked jobs in design, marketing, public relations, law, engineering, etc. And as manufacturing employment has declined over the past several decades, the industrial Jeremiahs continue to lament their loss in the share of jobs and prophesy an even more calamitous future if we don't protect our manufacturing base and slow our descent down the slippery slope to the service economy.

In fact, we are not manufacturing less, we are manufacturing more goods with fewer workers. This confusion between jobs and goods produced or services delivered is a product of the old economy in which people were defined by the products they made or the services they delivered. This was a natural artifact of the old economy where the principal competitive requirements were to produce standard goods and services in high volumes at low cost. In the new economy, competitive standards are more complex by including value-added quality, variety, customization, convenience, customer service, and continuous innovation as well as direct production and service delivery. And in the new economy, much of the value added is provided in the office functions.

In this study, we take a new approach because the traditional practice of tracking employment trends by industry (manufacturing, agriculture, personal services, wholesale trade, etc.) misses activities that cut across industries or are far removed from direct production or service delivery. Because of this practice, the increasing importance of front-office tasks is not captured in official reports.[5] And because many researchers use changes in industrial employment as a cornerstone in their theory of economic development, they have missed trends in what people *do* at work and the value added from those tasks.

In place of the industrial labor model, we developed a new set of categories based on workplace *functions*. We categorize specific work tasks into five major economic functions and, for the sake of brevity, denote each by the work site where they most commonly occur. They are:

extractive production (the farm): direct labor in agriculture, mining, fishing, logging, and forestry;

industrial production (the factory): direct labor in manufacturing, public utilities, construction, and transporting goods to market;

low-skilled services (the counter): direct labor in performing consumer services that require limited training—e.g., barbers, retail clerks, and restaurant workers;

high-skilled services (the hospital/classroom): direct labor in performing consumer services that require specialized training—e.g., health care, education, police, and firefighting;

administration and coordination (the office): all workers involved in management, administrative, business, and financial services.

The first two functions represent goods production, while the third and fourth functions deal with consumer services. Each of these is defined narrowly to include only the direct labor necessary for performing the task. The fifth function combines all the activities of managing and coordinating private and public enterprises. This approach represents the first attempt to quantify the overall size of office activities.

Elite Jobs, Good Jobs, and Less-Skilled Jobs

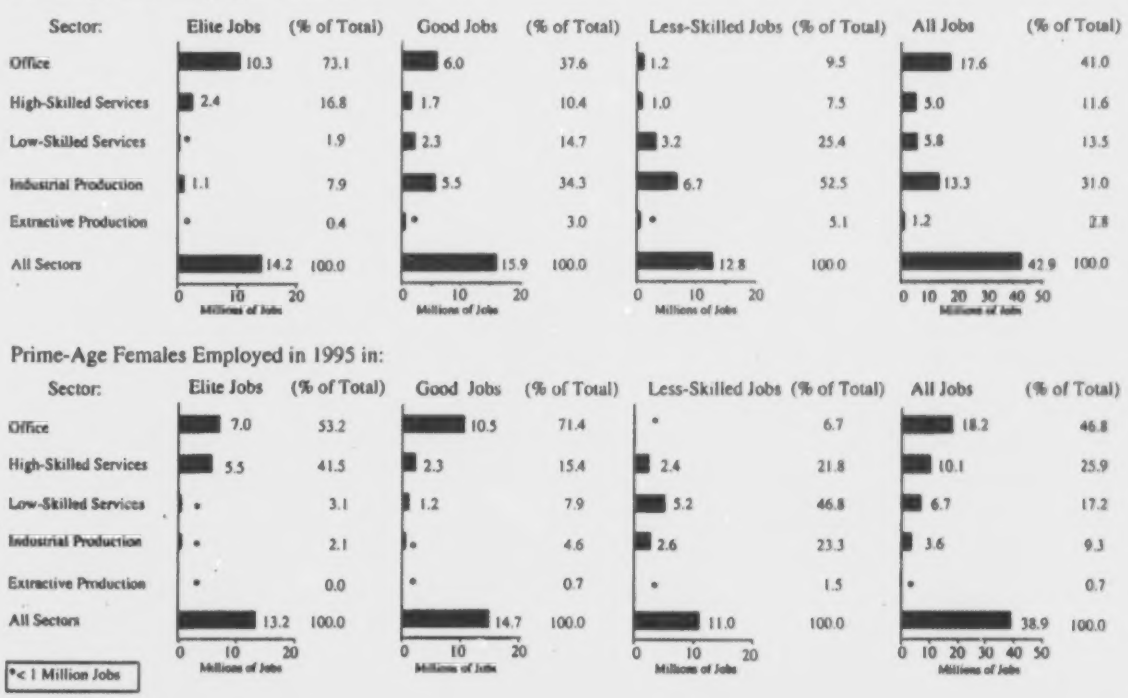
While we have altered the industrial coding procedure dramatically to create the functional categories, the official Labor Department occupation categories are close to a hierarchical combination based on the quality and pay of the job: the major divisions are managers, professionals, technicians, sales, clerical, operatives, helpers, and farm laborers.[6]

By reorganizing and combining occupations, employment can be divided into three broad categories: elite, good, and less-skilled jobs:

- the top tier of **elite jobs** holds the managers and professionals (with business professionals);
- the middle tier of **good jobs** contains supervisors in industrial and nonindustrial settings, technicians, craft workers such as carpenters and plumbers, police, firefighters, and clerical and administrative workers;
- the bottom tier of **less-skilled jobs** requires the least education and training and is the lowest paid; it consists of factory operators, sales-clerks, janitors, food service workers, and farm and industrial laborers.

Figure 1

The Majority of Elite and Good Jobs Are in Office Activities


Prime-Age Males Employed in 1995 in:
Sector: Elite Jobs (% of Total) Good Jobs (% of Total) Less-Skilled Jobs (% of Total) All Jobs (% of Total)
Office 10.3 73.1 6.0 37.6 1.2 9.5 17.6 41.0
High-Skilled Services 2.4 16.8 1.7 10.4 1.0 7.5 5.0 11.6
Low-Skilled Services * 1.9 2.3 14.7 3.2 25.4 5.8 13.5
Industrial Production 1.1 7.9 5.5 34.3 6.7 52.5 13.3 31.0
Extractive Production * 0.4 * 3.0 * 5.1 1.2 2.8
All Sectors 14.2 100.0 15.9 100.0 12.8 100.0 42.9 100.0
0 10 20 Millions of Jobs
0 10 20 Millions of Jobs
0 10 20 Millions of Jobs
0 10 20 30 40 50 Millions of Jobs
Prime-Age Females Employed in 1995 in:
Sector: Elite Jobs (% of Total) Good Jobs (% of Total) Less-Skilled Jobs (% of Total) All Jobs (% of Total)
Office 7.0 53.2 10.5 71.4 * 6.7 18.2 46.8
High-Skilled Services 5.5 41.5 2.3 15.4 2.4 21.8 10.1 25.9
Low-Skilled Services * 3.1 1.2 7.9 5.2 46.8 6.7 17.2
Industrial Production * 2.1 * 4.6 2.6 23.3 3.6 9.3
Extractive Production * 0.0 * 0.7 * 1.5 * 0.7
All Sectors 13.2 100.0 14.7 100.0 11.0 100.0 38.9 100.0
0 10 20 Millions of Jobs
0 10 20 Millions of Jobs
0 10 20 Millions of Jobs
0 10 20 30 40 50 Millions of Jobs
*< 1 Million Jobs

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In this approach, the earnings difference in 1995 between each tier was almost a whole order of magnitude: less-skilled, blue-collar workers, salesclerks, and service workers averaged $14,700; supervisors, clericals, and skilled manual workers earned $25,300 on average; and those in the elite category averaged $42,200. These earnings levels are quite different depending on age and gender. For prime-age males, the three-step pay scale of elite, good, and less-skilled jobs was $58,600, $35,800, and $24,000; for prime-age females, the scale was $33,700, $21,400, and $13,000. Tracking which types of workers staff each of these jobs and how that has changed over time says a lot about the ability of the economy to provide good employment opportunities.

The quality of employment is tied closely to the functional categories described above. As Figure 1 shows, the majority of managers and professionals are employed in the office—73.1 percent for males and 53.2 percent for females. In terms of good jobs, the office also is the main source of employment for females—71.4 percent. Thus, combining good and elite jobs results in the office again being the main source of employment for females (63 percent) and males (54 percent).

It is interesting to note that the male level of the 70 percent range for elite jobs being office jobs is consistent back to 1959, the first year of our study. Females, on the other hand, were much more likely to be in professional jobs, such as health care and education, before the 1970s.

Who Works in the Office

The traditional view of the office is as a workplace dominated by secretaries and other support personnel serving a few managers. But in today's Office Economy (see Figure 2), the number of business managers and business professionals has increased dramatically.

For the purpose of this study, the office function consists of five components:

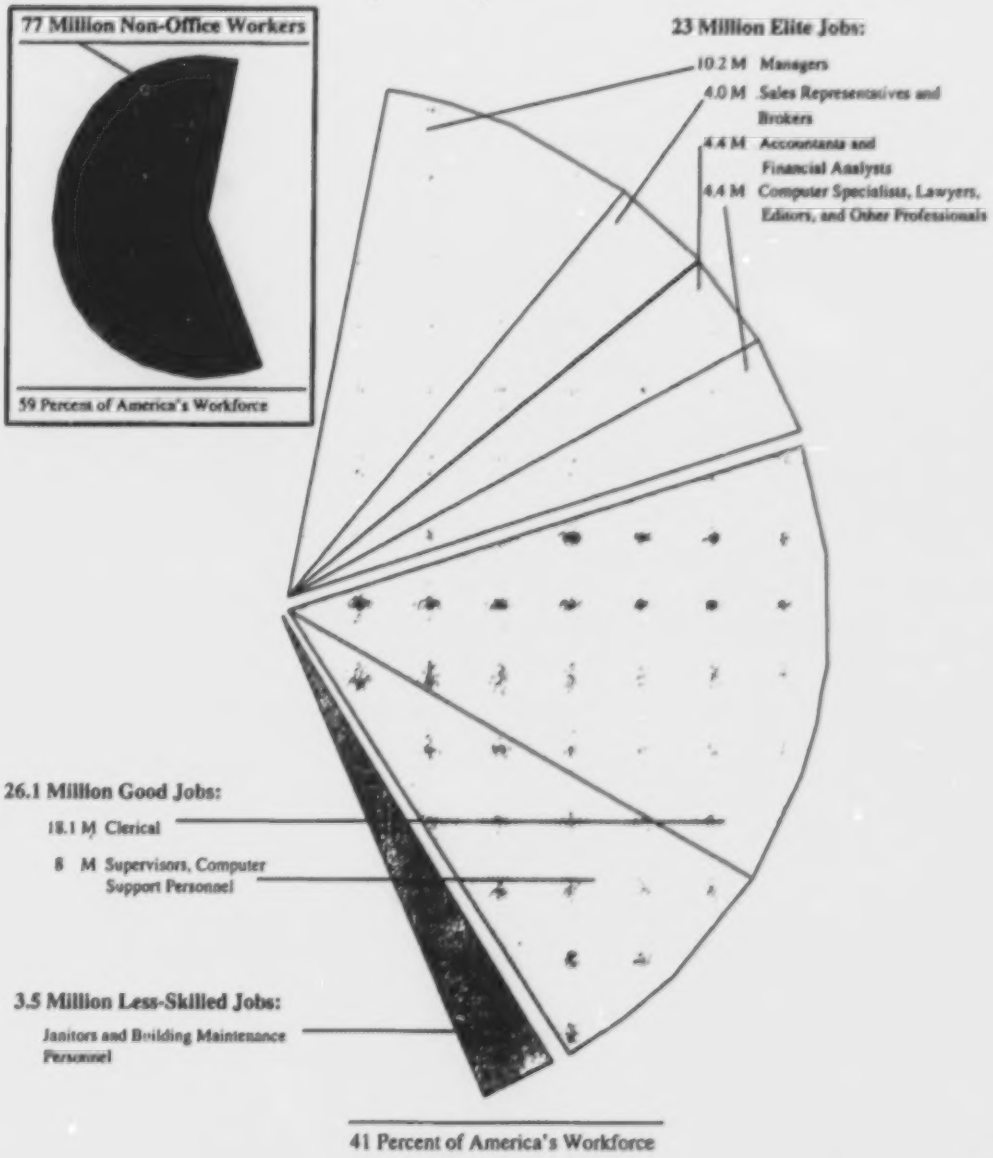
1. All managers and approximately one-half of supervisors involved in coordinating and supervising activities in industries, producing goods, or performing services. This is based on the assumption that approximately half the work of supervisors is directly related to production; the other half is related to management, planning, etc.
2. Employees in the entire FIRE (finance, insurance, and real estate) sector. These industries traditionally have been thought of as services, but they actually involve managing tangible and financial *assets*, whether personal or business.
3. Business professionals employed in the managerial hierarchy. There are almost as many employed here as in all of FIRE. Most of these workers are sales representatives, accountants, and the like. But there are also 1.6 million (out of almost 4 million) science-related professionals who work neither in academia nor for manufacturing firms. These are often computer-related analysts servicing headquarters' activities.
4. Employees in public administration and nonprofit social service institutions. These workers perform coordinating functions for the purpose of society as a whole.
5. Support staff, primarily clerical and administrative, but also janitors and other office help.

The share of the office function varies widely by industry. In 1995:

- Retail trade and personal and entertainment services had the lowest concentration (20 percent) of front-office workers, and most of those had relatively low pay.
- In the goods-producing industries—agriculture, mining, manufacturing, and construction—approximately 30 percent of the workers were allocated to the office function. This ratio was slightly higher in health care, education, and wholesale trade.
- Approximately half of the output of the transportation and communication industries is consumed by businesses. Since this is for business purposes, one-half of their employment was assigned to the office function.
- The remaining industries are organized primarily as coordinating activities and, therefore, put almost entirely in the office function: FIRE (100 percent), business services (73 percent), and public administration (67 percent).

Figure 2

Who Are America's 52.6 Million Office Workers?


77 Million Non-Office Workers
59 Percent of America's Workforce
23 Million Elite Jobs:
10.2 M Managers
4.0 M Sales Representatives and Brokers
4.4 M Accountants and Financial Analysts
4.4 M Computer Specialists, Lawyers, Editors, and Other Professionals
26.1 Million Good Jobs:
18.1 M Clerical
8 M Supervisors, Computer Support Personnel
3.5 Million Less-Skilled Jobs:
Janitors and Building Maintenance Personnel
41 Percent of America's Workforce

For the entire office category, fewer than one in five workers (18 percent) came from manufacturing, construction, mining, or agriculture; 16 percent were in FIRE; 9 percent were in public administration, 21 percent were in professional services, and the rest were divided between other service and trade industries.

The occupational structure of the office function was equally diverse: 19 percent of its workers were classified as managers; 24 percent were professionals; 15 percent were supervisors; 34 percent were clerical and administrative support staff, and 7 percent were less-skilled blue-collar and service workers.

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More than half of these workers have bachelor's degrees. A result is that a majority of the college-educated labor force (61 percent of prime-age male workers and 45 percent of prime-age female workers) was employed in office-related activities in 1995.

The Office Takes Over

Visit any American suburb, any downtown, any strip mall, any industrial park, any shopping center. Look beyond the storefronts, the warehouses, the machine shops, and the parking lots. You'll find offices—high-rise towers for banks, insurance companies, government agencies, accountants, and lawyers; sprawling low-rise complexes containing small- and mid-sized real estate offices, and consultants; cheap walk-up offices for struggling entrepreneurs; office suites with plush carpets and shared secretaries for executives who are switching careers in mid-life from corporate to consultant.

Offices used to be "downtown." Now they're everywhere—satellite office centers in suburbs; office parks near airports and transit stations; offices in industrial parks and on factory grounds; offices above glittering malls or in plain strip centers; offices in former bedroom communities that have gradually become cities of their own.

For the most part, analysts have assumed that office work is only the superstructure atop a much larger industrial base. Traditionally, changes in the industrial base were considered the motivating forces in the economy, and the health of the office and service sectors was dependent on these more fundamental economic forces.

This study suggests the opposite—that offices are now the tail that wags the dog. By any measure of economic impact, it is the office sector that now dominates (see Figure 3).

Figure 3

Office Employment Has Grown to 41 Percent of All Jobs

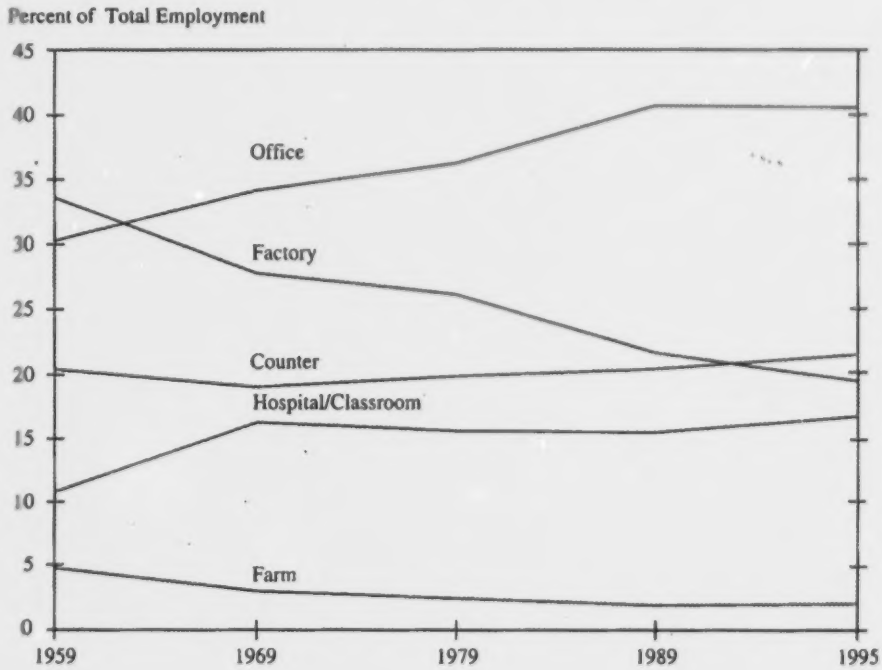


Figure 3 demonstrates the substantial change in employment shares from 1959 to 1995 in each of the five employment categories. The two biggest movers were the office and factory sectors--the office increased from 30.4 to 40.5 percent of all workers, while the factory declined from 33 to 19 percent.

Extractive production, the other goods-producing sector, also fell from 5 to 2 percent, meaning that only 21 percent of the labor force plows, mines, builds, transports, and transforms physical goods. This combined 17-percentage-point decline represents a shifting of 20 million workers over the course of the time period followed. Most of the jobs lost were those of blue-collar male workers.

Somewhat surprisingly, the low-skilled services category did not move significantly. Initially, its employment share dropped from 20.5 percent of the workforce in 1959 to 19.2 percent in 1969, and rose to 21.6 percent by 1995. The initial decline was driven by a fall in personal service employment, in particular, the drop in employment of African American housekeepers. After 1969, growth in the retail component (which includes restaurants) led to a slow rise in the share of these activities. So, the experts who track the explosion of hamburger flippers and their ilk are looking at the data selectively and would find much less of a change if they started their analyses from an earlier year.

The high-skilled services category grew unevenly. Accounting for 10.9 percent of workers in 1959, its share rose sharply to 16.2 percent by 1969, then declined slightly over the next 20 years to 15.5 percent. But in the 1990s, the category grew again, reaching its maximum of 16.5 percent. In terms of components, employment in health care grew steadily from 3.7 percent of the workforce in 1959 to 6.7 percent in 1995; while in education, employment rose from 5.6 percent in 1959 to 8.7 percent in 1969 and dropped to 7.6 percent in 1979.

The restructuring of the economy meant that industrial production fell from first to third place in total employment. The trend continued even as the economy thrived from 1989 to 1995. Moreover, all three manufacturing subcomponents experienced large declines in their share of employment:

- Low-wage manufacturing industries decreased the most, about 56 percent (accounting for 9.6 percent of the workforce in 1959, but only 4.3 percent by 1995).
- High-wage manufacturing fell by about 40 percent (from 13.6 percent to 7.5 percent of total employment).
- Nonmanufacturing employment in traditional blue-collar industries (predominantly construction) also declined by about 25 percent (10.2 percent to 7.7 percent).

The growth in the office sector also can be traced: two-thirds occurred because of the increase in front-office functions within manufacturing and service firms. The remaining third occurred because of growth in primarily office-only sectors. In particular:

- Employment in FIRE industries grew steadily through 1989 (up from 4.5 percent of all workers in 1959 to 7.0 percent in 1989) before falling a bit in the 1990s (to 6.6 percent in 1995). This still left a net gain of 2 percentage points over the entire period studied.
- Business professionals (e.g., sales representatives, inspectors, accountants, etc.) benefited from the remixing of employment within industries. Their share of overall employment grew slowly from 1959 through 1979, but then rose quickly from 3.9 to 5.9 percent. Virtually all of this gain was due to changes of employment within industries rather than between industries.

News reports about downsizing and middle-management layoffs have been common during the 1990s, but their overall numbers actually increased from 1989 to 1995. Since 1959, the employment share of managers and supervisors actually has *risen* by 5.4 percentage points. Middle managers who lost jobs in some firms were offset by larger gains in others.

However, restructuring did affect the share of support labor; new computer technologies for information retrieval and word processing led to a decline in the number of clerical workers after 1989.

All of the movements have differential impacts on males and females. Females were less likely to be involved in industrial production, and their

share of employment in this sector declined from about 20 percent to 9 percent. Also, as they became more permanent members of the labor force, they became much less likely to work in low-skilled counter activities—declining from 28 percent in 1959 to 17 percent in 1995.

While a slightly higher percentage of females worked in high-skilled services, the primary employment area for females became the office, more strongly than ever before. By 1995, fully 47 percent of prime-age females were office workers, up from a level of 32 percent in 1959. Virtually all this growth was in high-paying occupations. Among female office workers in 1959, 80 percent were clerical and support workers, and only 13 percent were managers and professionals. By 1995, the share of the latter almost tripled to 31 percent, while the clerical share declined to 38 percent. The initial opportunities for female managers and supervisors were stark: In 1959, only 2.1 percent held these jobs, but by 1995 the figure was 9.3 percent.

For prime-age males, industrial employment has always been more important, accounting for 45 percent of jobs in 1959 before falling to 31 percent in 1995. Employment in office jobs rose from 30 to 41 percent offsetting the loss of factory jobs. In 1959, office employment lagged behind industrial employment by 15 percentage points; by 1995, the positions were reversed and the office employment share was 10 percentage points higher. Furthermore, male workers in this field tended to hold high-paying managerial and professional jobs (59 percent of the total).

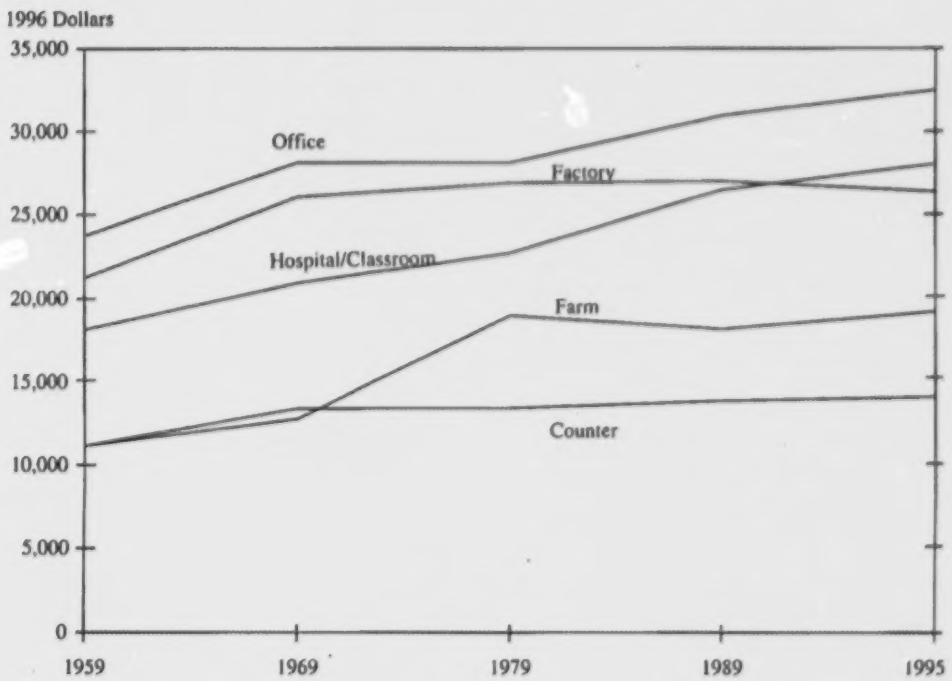
There is an added racial component. While 30 percent of White males held industrial jobs, 37 percent of Blacks and Hispanics were employed in this sector. Whites also were less likely to be in low-skilled services but were most concentrated (44 percent) in office employment. Blacks and Hispanics, on the other hand, had less access to high-paying office jobs, with only 30 percent of the former and 25 percent of the latter in these jobs.

Office Work Pays Best

The office function—which has a high concentration of managers and professionals—has *always* paid best (see Figure 4). With an average

Figure 4

The Highest Pay Is in Office-Related Activities



salary in 1995 of $32,500, it was 47 percent higher than the pay of non-office workers. Prime-age male office workers earned $49,400, which was 49 percent greater than those in all other fields. Prime-age female office workers had a 30 percent earnings premium over other female workers, with a salary of $26,400.

Despite a lull in the 1970s, office earnings continued to increase over the entire period. The pay advantage of office workers actually declined a bit during this period, dropping from 39 percent in 1959 to 31 percent in 1979. However, since 1979, the increasing earnings inequality among males has driven the office premium up. During this period, female office workers maintained an approximately 30 percent edge over female workers in other sectors. But among prime-age males, the relative standing of office employment grew from 31 percent to 49 percent. So, it would appear that the widely reported rise in male earnings inequality during these years is closely connected to the evolution of the new Office Economy.

The earnings history for other categories in the workplace from 1959 to 1995 includes:

Factory work: The relative position of industrial production workers has declined. In 1959, they earned the second-highest wages (just 11 percent behind office workers). Their earnings remained stable until 1979, after which their pay declined until they were 19 percent behind office workers in 1995, with average earnings of $26,200. Further, they lost their advantage over high-skilled service workers, falling to third place in the earnings order.

Even among high school-educated prime-age males in 1995, office workers made 16 percent more than factory workers. This premium has been almost constant since 1959, and also applies to males who have not finished high school or who have received bachelor's degrees.

Hospital/Classroom work: In 1959, even though this group had the highest average level of schooling, its pay was 5 percent *below* the average for all workers (and 24 percent below office workers). Among workers of that era with bachelor's degrees, teachers were the lowest-paid subgroup, and health-care workers were below average. In the ensuing 36 years, however, the earnings of high-skilled service workers in health care and education have risen substantially. By 1995, hospital/classroom earnings were 6 percent above average, their $28,100 annual pay was now only 15 percent below that of office workers.

It may seem surprising that health-care workers rank behind the office in average pay because when we think about medicine, we often think of doctors who typically earn more than $100,000 annually. But their numbers are dwarfed by the ranks of middle-income medical professionals—physicians' assistants and registered nurses—and the enormous number of low-paying, low-skilled positions in health-care facilities (nurses' aides, janitors, etc.). In education, similarly, college professors and administrators are well paid, but the average for the category is reduced by the much larger number of middle-income public schoolteachers.

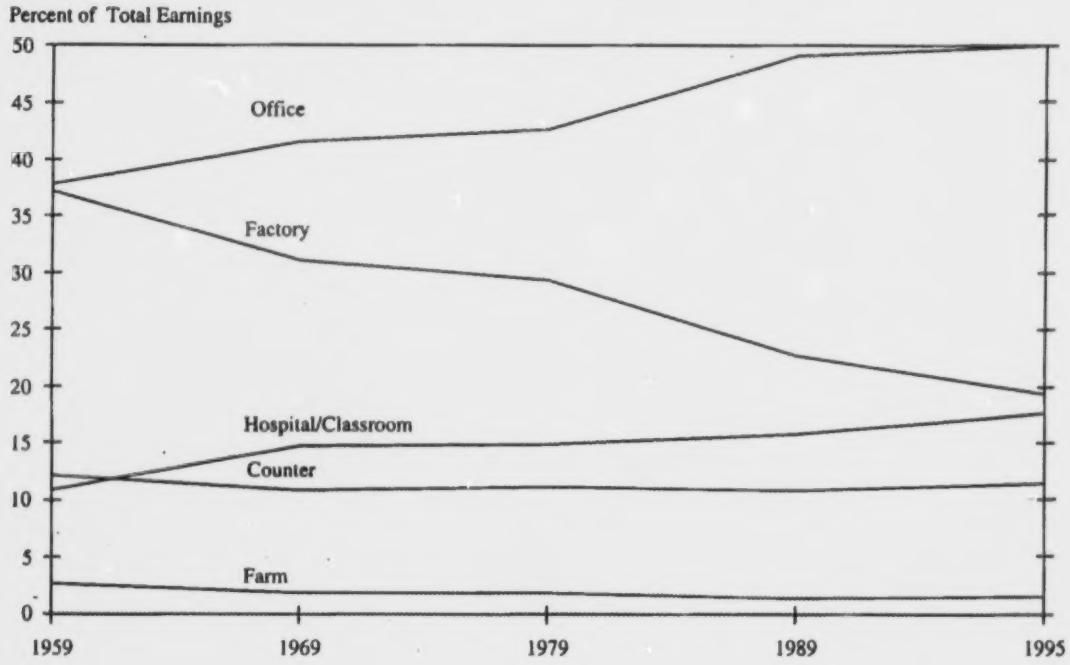
Counter work: Earnings among those who provide direct services to consumers, such as retail clerks and restaurant workers, have been almost flat since 1969, averaging $14,200 in 1995. The classic image of these being low-paid, dead-end jobs is reflected in the fact that earnings in this sector were only one-half that of other workers. In addition, there has been a growth in the share of part-timers: In 1959, only 21 percent of counter workers had part-time status before increasing to 39 percent by 1995.

Farm work: Earnings in the extractive industries, such as farming, mining, logging, and fishing, rose sharply in the 1970s and have remained at about $19,000 since 1979. This level is still 30 percent below that of all other workers, reflecting a continuing large number of low-paid agriculture workers and the downward pressure on wages in the mining and forestry industries due to international competition.

So, the earnings movements parallel the job movements. Office work and high-skilled services were the two highest paying sectors in 1995 and the ones with the most employment growth since 1959. This combination of employment and relative earnings growth meant that the office sector accounted for exactly one-half of all earnings in the economy (see Figure 5). This figure underscores the centrality of office work. In 1959, office and industrial work were responsible for approximately the same share of earnings. By 1995, the factory sector had fallen to only 19 percent of the total, a full 31 percentage points below the share of the office sector.

Figure 5

50 Percent of All Earnings Now Go to Office Workers



The Majority of College Graduates Become Office Workers

There is a traditional ideal that higher learning should be the preparation for higher-purpose activities. The original universities in England and the United States were training grounds for scholars and theologians. Over time, the elite decided that university education was a good cultural preparation for their sons. In the 20th century, two new roles developed for colleges. First, the learned professions of law and medicine began to require that their practitioners be trained in college settings to obtain licenses to practice rather than through the traditional apprenticeship route. Second, as public primary education spread, the need for adequate teacher-training led to the growth of new higher education programs.

Preparing for the practicalities of a business career usually is not considered as one of the lofty missions of the university. The democratization of the colleges in this country began in earnest immediately after World War II when G.I. benefits were available for higher education. As more people entered universities, their final employment became more closely tied to business activities. By 1959, one-half of prime-age college-educated males were employed in the Office Economy. This connection of college education and office employment did not apply to females, and 80 percent of those who obtained bachelor's degrees entered either health or education.

Since 1959, the expansion of the number of college graduates has gone hand in hand with the expansion of the office sector; by 1995, the share

Figure 6

The Majority of College-Educated Males Become Office Workers

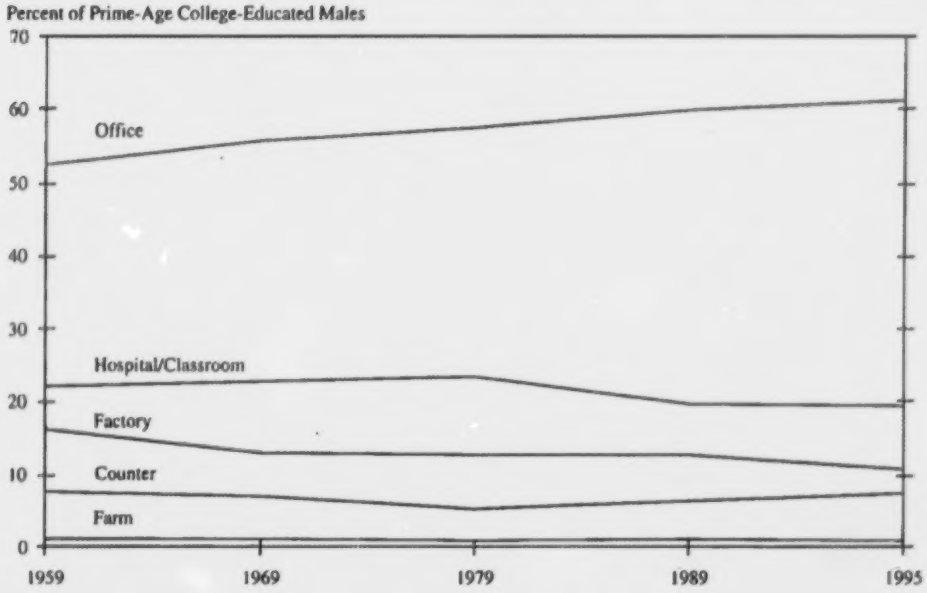
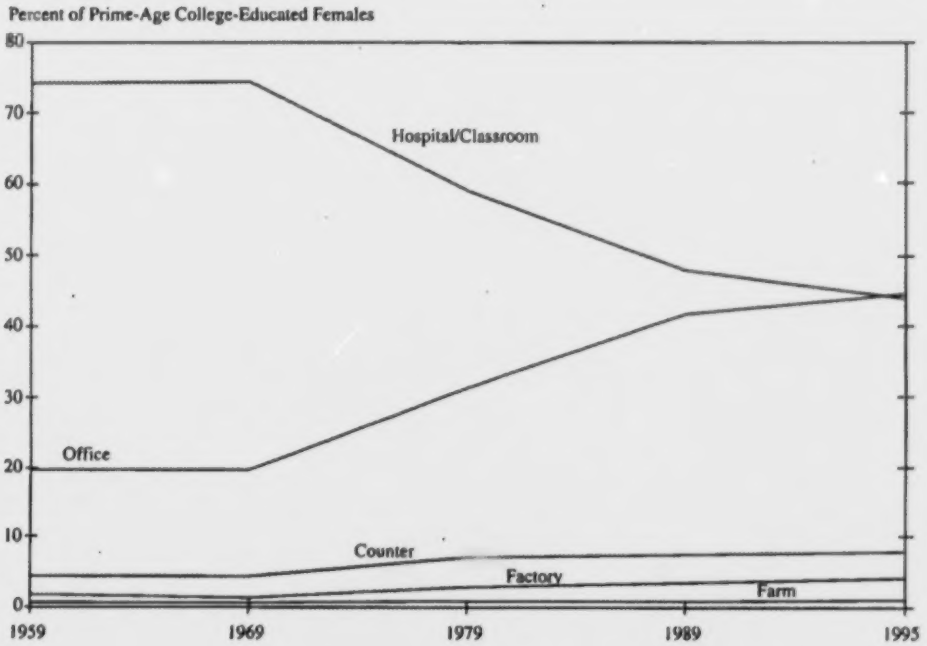


Figure 7

College-Educated Females Have More Opportunities Than Ever Before



of office workers among college-educated males had risen to 61 percent (see Figure 6).

More striking, however, is the opening up of opportunities for females. There has been a huge gain in the share of college-educated females in office jobs (see Figure 7). In 1959, only 4 percent of them had jobs as business managers; by 1995, this figure had increased to 13 percent. Similarly, females were practically excluded from business professional jobs in 1959 (only 2 percent); by 1995, 13 percent of college-educated females were employed in these fields.

Among male college graduates in 1995, the most common occupation was manager, accounting for 22 percent of employment. Another 6 percent were doctors and lawyers, but this figure has hardly changed from 1959. Similarly, the share of science-based professionals who were not teachers remained flat at about 14 percent. The share of teachers, however, declined from 14 percent in 1959 to 9 percent in 1995.

The importance of office employment is underscored by the fact that among workers with bachelor's degrees the earnings of office workers are the highest. Among males, this is very pronounced and is evident throughout the entire period studied. For example, the earnings gap between office workers with bachelor's degrees and science-related professionals, such as engineers and chemists who worked in factory settings, remained at about 10 percent from 1959 to 1979. But over the next 16 years, earnings of those factory employees *fell* by more than 10 percent (in constant dollars), resulting in a 29 percent advantage, or "premium," for office workers. The pay difference of office versus skilled services among college-educated males remained fixed at about 10 percent. In 1995, office workers earned $63,100, while those in education and health care averaged $57,400.

Among female college graduates, employment has been concentrated in either office or high-skilled employment with very few in either industrial, farm, or counter settings. In 1959, when the vast majority of females were in health care and education, their earnings in these jobs were slightly higher than their counterparts in the office. However, by 1995, as females became more common in the office, the pay premium for office employment appeared—female office workers averaged $36,400, while those in the high-skilled service sector earned $33,500.

More Educated Workers, More Good Jobs

The United States has been committed to expanding educational opportunity for over 150 years, as it was one of the first nations to make public schooling mandatory. At the turn of the 20th century, a movement began to extend this commitment to publicly provided high school training. Finally, after World War II, the G.I. Bill was the impetus that made college attendance more common. By 1970, approximately one-quarter of each age cohort of students eventually would earn at least a four-year college degree. At each point, civic leaders argued that the cost was really an investment in America's future and, hence, well worth making.

Figure 8 tracks the effect of this commitment to the educational attainment of the prime-age workforce. The massive decline in the share of high school dropouts, from 53 percent in 1959 to 11 percent in 1995, is offset by the steady increase in the shares of those with bachelor's degrees and those with some college. The approximately equal number of each of these two groups means that one-half of those who their continue education after high school will get a four-year degree.

Males and females took part in this education explosion equally. But the effect among African Americans was even greater. In 1959, 79 percent had not finished high school; by 1995, only 15 percent had not completed high school. Consequently, the 27-percentage-point gap in Blacks' educational level versus Whites' was reduced to 5 percentage points.

In Section II, we laid out how occupations were combined into three large groups: elite, good, and less-skilled jobs. In 1959, 47 percent of workers were in less-skilled jobs, falling to 36 percent in 1995 (see Figure 9). This loss was offset by a gain in elite jobs from 17 to 28 percent. In other words, the 11-percentage-point gain at the top equaled the decline in the share in the less-skilled jobs. Somewhat surprisingly, the share of good jobs remained constant at approximately 36 percent.

Figure 8

The Educational Credentials of the Workforce Have Grown Substantially Since 1959

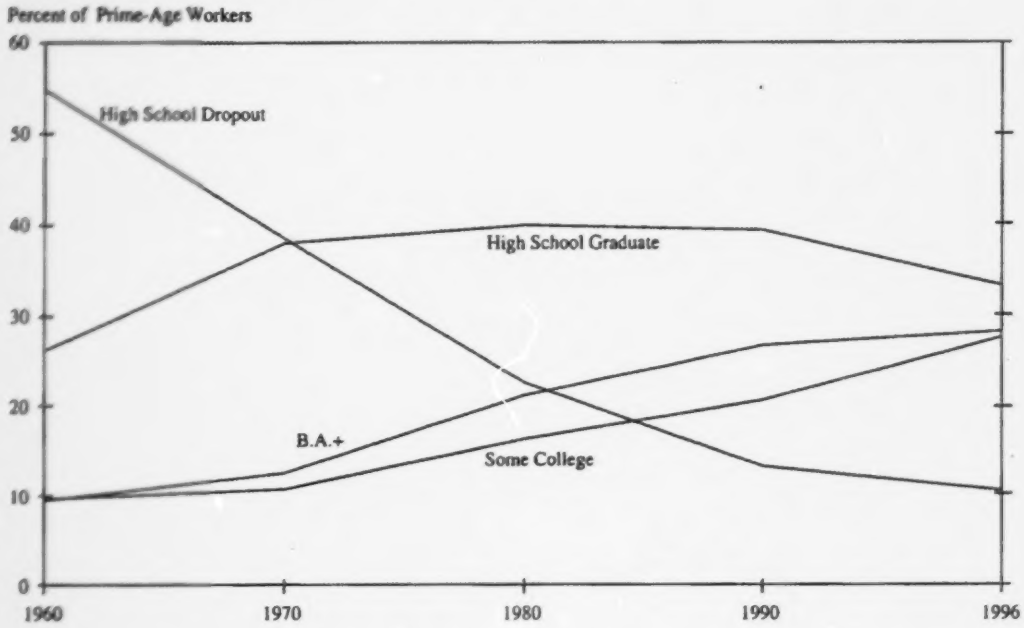


Figure 9

Fewer Workers Have Less-Skilled Jobs Than Ever Before

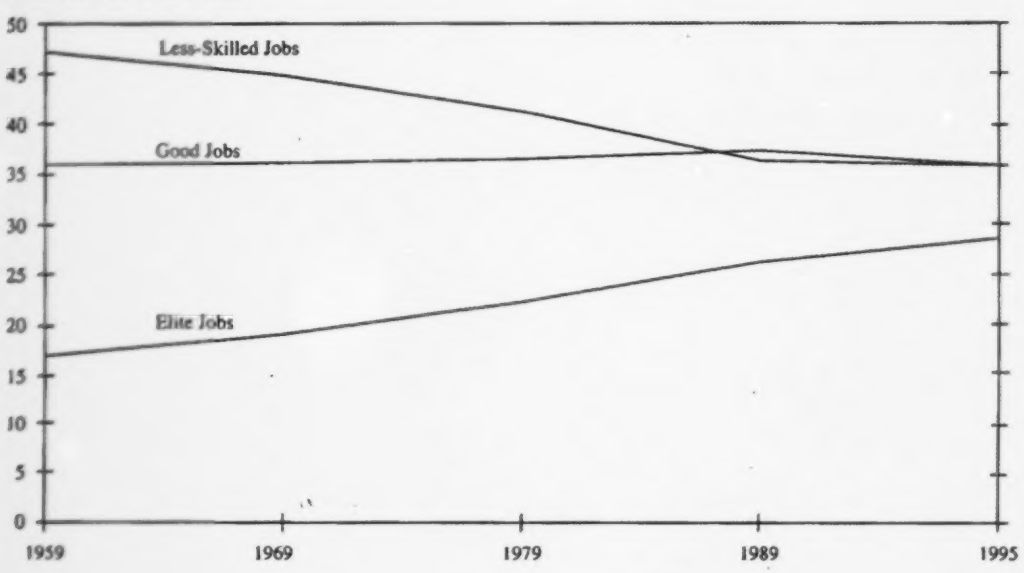
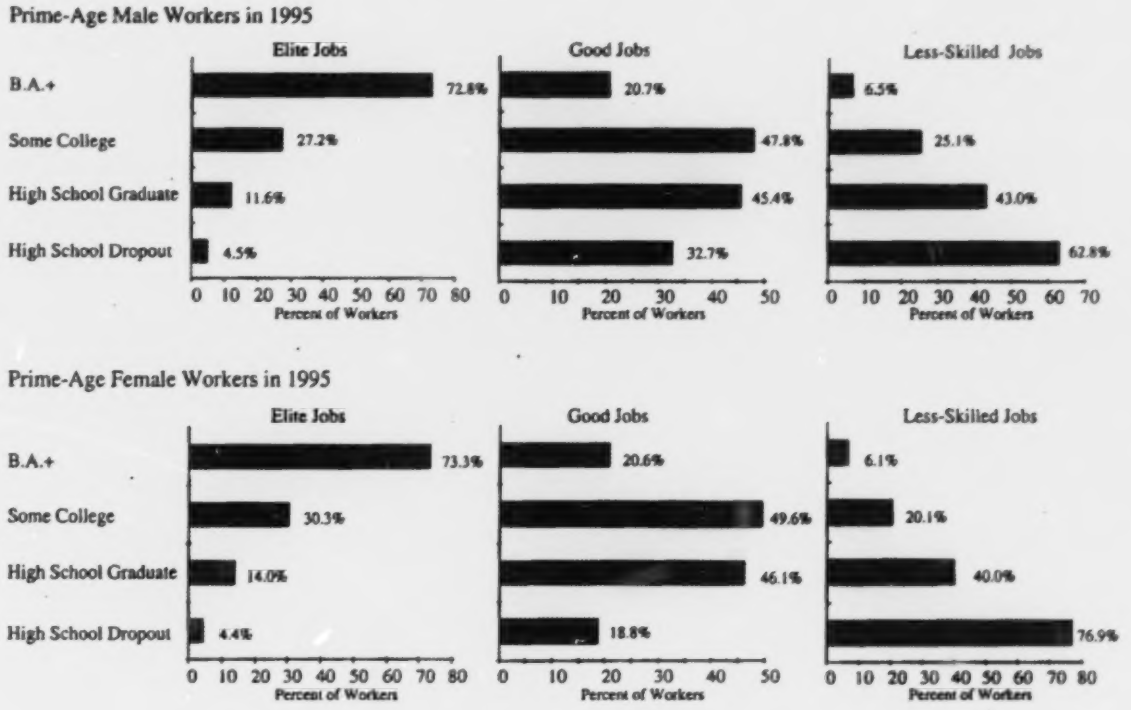


Figure 10

Higher Education Is the Gateway to Elite and Good Jobs



These figures represent the distribution of employment among all workers in the economy. Young and old workers have less connection to the labor market and tend to be concentrated in less-skilled jobs. Therefore, the occupational distribution of just prime-age workers shows a greater concentration in good and elite jobs. In 1995, 33.4 percent were in elite jobs, 37.4 percent were in good jobs, and only 29.2 were in less-skilled jobs. Furthermore, the movement to the top tier from the bottom tier also was evident.

In 1995, the distribution of male and female workers in these various job tiers was almost identical. But this was not always the case. In 1959, females were much more likely to be in less-skilled jobs than males: 53 to 41 percent. Therefore, as they both moved to 33 percent in 1995, the upgrading for females was larger—20 percent of the female labor force fully upgraded their occupations. Further, the movement by males into elite jobs was almost complete by 1979. For females, however, these past 16 years have been a time of important employment upgrading: in 1979, only 23 percent were in elite jobs compared to 33 percent in 1995.

This movement to managerial and professional jobs coincides with the increase in education and the growing presence of elite jobs within the office sector. As Figure 10 shows, the correlation between the education and occupation tier is very strong. For college-educated workers, approximately three-quarters held managerial and professional positions. This share is down slightly from its maximum of 83 percent in 1969. So, the popular concern about whether college graduates are still getting the very best jobs is given some support. Most still land on their feet, but the competition for these slots is intense, and slightly fewer people are successful in their quest.

A Growing Divide

In terms of pay, there has been a surprising increase in earnings inequality among workers since 1979. College-educated workers are gaining

ground, while all others are experiencing real income losses. This rising college pay premium is occurring at the same time that the *supply* of those graduates is increasing. This would seem to violate the laws of supply and demand. Normally, the relative price of an item (in this case, college-educated workers) declines if its supply increases. Consequently, the fact that those workers are earning more, not less, means that demand for college-educated labor must be increasing even faster than the supply.

The earnings paths of the three occupation tiers diverge over time (see Figure 11). After growing almost in tandem from 1959 to 1979, they begin to diverge. From 1979 to 1995, average earnings of elite jobs rose 10 percent to $58,600, earnings for good jobs dropped 7 percent to $35,800, and less-skilled jobs averaged $24,000, a loss of 16 percent.

A more common way of showing these movements is by tracking earnings by education level. For females, the story is one of earnings gains for all. But for males, except for college-educated workers, earnings are down from 1979 (see Figure 12). The causes of this growing gap are rooted in the differing employment shares in managerial and professional jobs. An indication of this is that male workers with just high school diplomas who have elite jobs earn more than those with bachelor's degrees who do not have such jobs ($43,000 to $42,000). Further, among the college-educated, only the earnings of those with elite jobs increased.

For the past decade, economists and politicians have been debating the causes of these earnings movements because they worry about social consequences. In the industrial labor model, the tendency is to look at increasing the skills requirements necessary to exploit new technology as the source of new educational requirements, and economists have coined the term "skill-biased technological change" to explain the increased demand for more highly skilled labor tied to the introduction of new technology. In other words, the argument goes, high-tech workers are the wave of the future.

Yet, the data to prove this argument have been lacking and many analysts have turned to it by a process of elimination: Since no other cause is evident, it must be technological change that particularly benefits those with more education.[7] At a time when computer use has been skyrocketing, there is a certain appeal to this argument.[8]

The common image of advanced skills is associated with workers with highly specific technical knowledge—science-related professionals and technicians. If skill-biased technological change is truly driving changes in the workplace, then the earnings of technicians and scientific workers should be increasing first and the fastest.

Yet, we find that the pay of professionals in technical/scientific fields has stagnated or declined, while the pay of nontechnical, nonscientific business professionals and managers has increased. These office careers—managers, sales representatives, stockbrokers, and the like—are growing fields that are populated with workers who have bachelor's degrees. They have some computer skills, but they hardly are high-technology information workers.

Because our findings on the downward earnings trend of science-related professionals were unexpected (in view of the broad acceptance of skill-biased technological change as well as the media reports about the shortage of high-technology workers),[9] our study examined occupations in this field in greater detail. For example, the earnings of prime-age males with bachelor's degrees who were computer system analysts rose only 3 percent from 1979 to 1995, from $56,300 to $57,900. Engineers were the largest occupation among science-related professionals, although their share of jobs in scientific/technical fields actually fell from 75 percent to 53 percent, and their earnings dropped slightly from $63,000 in 1979 to $62,000 in 1995 (in 1996 dollars). Civil, electrical, and mechanical engineers were the most common areas of specialization, and *all* of these detailed occupations experienced at least a 4 percent earnings loss from 1979 to 1995.

These results do not support the thesis that technology is increasing the demand for skill and that the primary source of the workers with specialized technological skills are the winners in the new economy. In fact, it is the earnings of managers, sales representatives, lawyers, and doctors that have caused college-educated earnings to rise. So, it is the growing dominance

Figure 11

The Earnings Inequality Among Males Has Grown Depending on the Type of Job They Have

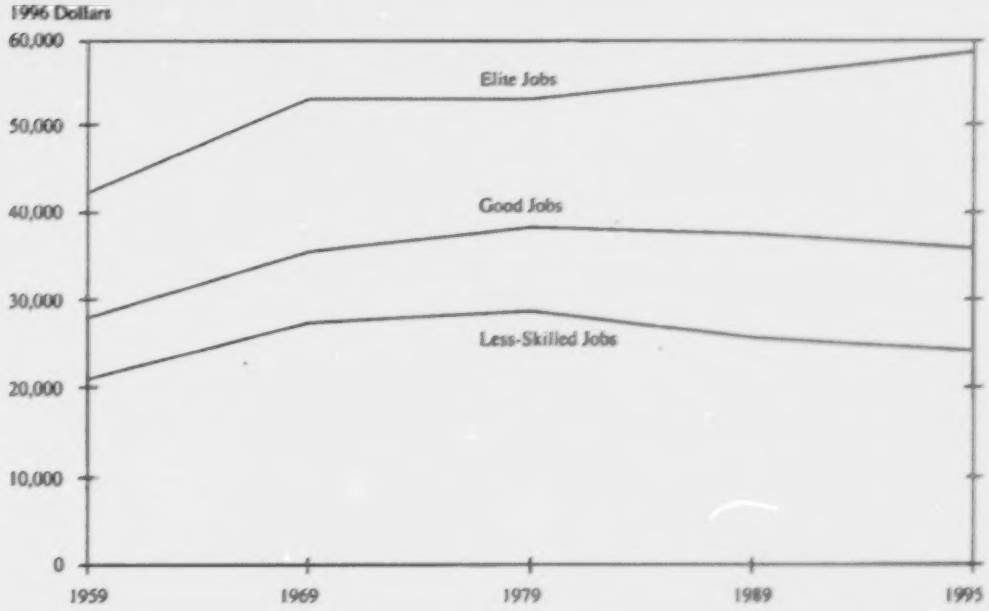
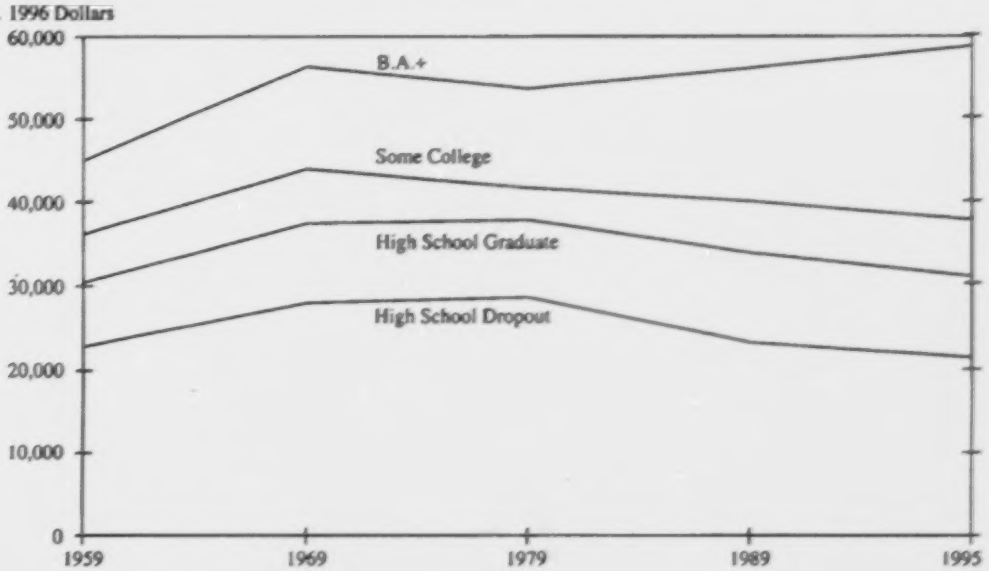


Figure 12

The Relative Earnings of College-Educated Males Has Increased Since 1979



of the Office Economy, not the technological one, that is behind these trends.

Access to elite office jobs seems to be a key in understanding earnings changes. For example, the earnings of males with only high school diplomas fell by 18 percent between 1979 and 1995. One-quarter of this decline can be attributed to the lower percentage of these workers who held managerial and professional positions in 1995. The rest of the decline is due to the large earnings loss in traditional blue-collar occupations, such as factory operatives and craft and repair workers. As discussed in the Introduction, while office pay was rising, industrial compensation was falling.

Male workers with some college are caught in the middle. On the one hand, their earnings were 22 percent higher than those with just high school diplomas in 1995, which was up from 10 percent in 1979. However, this is scant consolation given that their inflation-adjusted pay was down 9 percent.

As the number of college graduates has grown, fewer people with some college have been employed in office and elite jobs. In 1969, 56 percent of males with some college were employed in the office sector. By 1995, only 44 percent of this group was employed here.

On the other hand, males with some college increased their share of industrial production jobs from 24 percent in 1969 to 29 percent in 1995, displacing less-educated competitors for those positions.

These patterns were indeed limited to male workers. Except for those who did not finish high school (who lost 2 percent), female workers increased their pay considerably from 1979 to 1995. For females with bachelor's degrees, the increase was 32 percent, with some college—20 percent, with a high school diploma—11 percent.

A More Diverse Office Workforce

The growth of the Office Economy has sharply increased wages and workplace opportunities for African Americans.

Consider these two snapshots of the U.S. employment picture, taken almost four decades apart:

1959

- Average earnings of White males are $29,200 (in 1996 dollars)—*90 percent higher* than the $15,400 average for Black males.
- When White and Black males with the same education are compared, White males earn *67 percent more.*
- White males are more than twice as likely as Black males to work in the office (31 percent vs. 14 percent).
- Black workers are employed almost entirely in the low-skilled positions. The few who enter the managerial and professional categories work in the health and education fields.
- Among prime-age workers, only 1.9 percent of Black males and 0.8 percent of Black females are employed in managerial, law, medical, or business professional categories.
- More than 35 percent of White females have office jobs, compared to only 9.5 percent of Black females.
- Fully 56 percent of Black females (compared to only 24.4 percent of White females) are employed in low-skilled services, primarily as domestic servants averaging just $4,800 a year.
- Only one-third of Black females with some college work in office activities, compared to almost half of White females.

1995

- The overall earnings gap shrinks from a 90 percent to a 45 percent pay advantage for White males compared to Black males.
- The earnings gap shrinks from a 67 percent to a 35 percent advantage for White males compared to Black males, adjusted for education.
- The earnings gap shrinks from 75 percent to 14 percent for White females versus Black females.
- Office employment for males with some college is almost equal for Blacks and Whites (42 and 44 percent, respectively).
- The percentage of Black females with some college who work in an office environment increases from 34 percent in 1959 to 53 percent in 1995. The percentage of *all* Black female workers in the office increases from 10 percent to 40 percent.

Black males with bachelor's degrees experienced a large expansion of their job opportunities. In 1959, one-half of the (small) number of Blacks with bachelor's degrees were in education and health care, with only one-quarter in office employment. By 1995, these percentages had switched, with office work becoming the primary source of employment for Black males with college degrees.

During the past four decades, Black males have steadily moved out of the less-skilled jobs (see Figure 13a). And their employment share in elite jobs jumped from 4.4 percent in 1959 to 16.5 percent in 1995. While only 2 percent of Black males in 1959 were employed in managerial and business professional jobs—two of the subcategories in the top tier—the figure rose to 11 percent in 1995. Furthermore, the presence of Black males in good jobs increased from 19 to 33 percent.

The transformation of job opportunities for Black females was even greater, with their share in the less-skilled jobs declining from 83 percent in 1959 to 42 percent in 1995 (see Figure 13b). As their access to clerical jobs increased, their share in good jobs jumped from 9 percent in 1959 to 35 percent in 1995. Also, Black females became much more likely to land managerial and professional jobs, with the share of their employment in this category increasing from 8 percent to 23 percent.

These statistics also indicate, of course, that differences in income and workforce distribution between Black and White Americans remain substantial (as discussed further in the next section). But the growth of the office has reduced those disparities.

Equality Remains Elusive: Racial and Gender Gaps Continue

Despite social and economic advances, the United States still has substantial differences in jobs and earnings between males and females, and White and African Americans.

To explore the reasons is beyond the scope of this study. But it should be pointed out that while the Office Economy has reduced those racial and gender gaps, they remain substantial—and in many ways, puzzling.

The Gender Gap

For prime-age workers in 1995, males worked more than females and had higher total earnings and hourly compensation:

The average man worked 2,173 hours and took home $39,825—$18.33 per hour.

The average woman worked 1,787 hours and took home $23,189—$12.98 per hour.

Although the earnings gap between males and females has shrunk since 1959, males still, on average, earn 72 percent more than females. And female workers are much more likely to be low earners (below $20,000—51 percent) than high earners (above $50,000—7 percent).

Many fields, such as construction, crafts, and secretarial work, are still segregated by gender. Even within broad occupational categories, females are concentrated in certain areas: among professionals, females tend to be in elementary education, nursing, and social work.[10] In addition, females still are mainly responsible for child care and other family maintenance and often have interrupted employment histories.[11] Thus, they earn considerably less than males who have the same level of education and perform similar tasks.

The Black-White Gap

The good news is that the education gap between Blacks and Whites narrowed dramatically by 1995:

White males: 92 percent had finished high school; 60 percent had at least some post-secondary education.

Black males: 83 percent had finished high school; 43 percent had at least some post-secondary education.

White females: 94 percent had finished high school; 59 percent had at least some post-secondary education.

Black females: 87 percent had finished high school; 52 percent had at least some post-secondary education.

Figure 13a

Fewer African Americans Have Less-Skilled Jobs

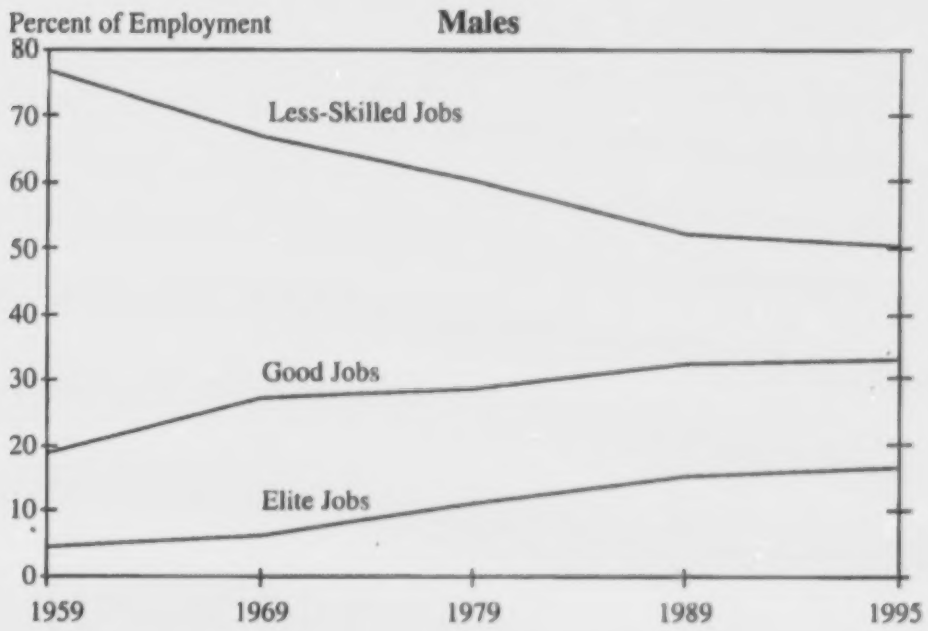
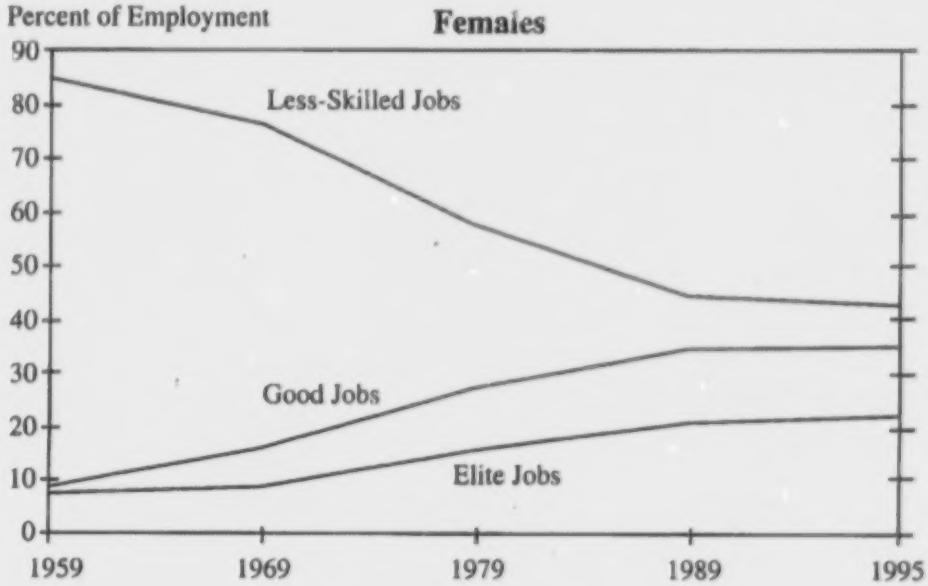


Figure 13b



The bad news is that the earnings gap—for males, anyway—did not decrease from 1979, remaining at a 55 percent advantage for Whites.

Even more significant, the gap for workers with the same level of education *increased* from 1979 levels:

- White males with a bachelor's degree earned 34 percent more than Blacks in 1995, up from a 22 percent difference in 1979.
- White males with only a high school diploma earned 47 percent more than Blacks in 1995, up from a 35 percent difference in 1979.

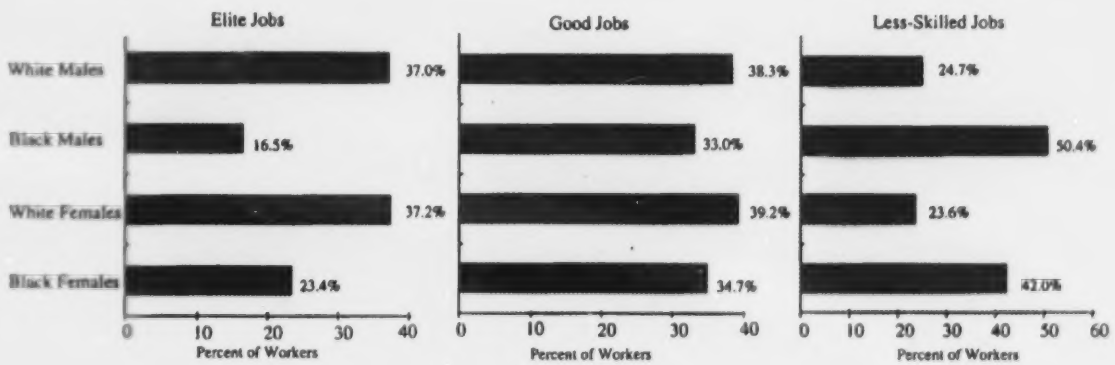
For females, there also was a reversal in the earnings status. In 1979, Black females were earning more than White females with the same education because they worked longer hours. By 1995, although Black females were still working more hours than White females (1,860 vs. 1,777), they were earning 14 percentage points *less*.

Also in 1995, Black male college graduates were still 10 percentage points less likely to be employed in office functions than their White counterparts.

For prime-age workers, White males were more than twice as likely as Black males to have elite jobs, and only half as likely to have less-skilled jobs (see Figure 14). The trend is similar, though not quite as extreme, for White and Black females.

Figure 14

African American Workers Are Less Likely to be Employed in Elite Jobs



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Conclusion

Implications for Society and Educators

The confidence that America has in education has been rewarded. Higher education has created a new economy, which in turn has rewarded those better-educated employees with higher wages. For a short period in the 1970s when there was a large inflow of new, young college graduates, there was concern that the public was becoming over-educated—that *too* many young workers had obtained higher education. But history has shown that this concern was illusory, and relative earnings of college-educated workers increased sharply after 1979.

More recently, the concern has been about dead-end, low-paying jobs—when the Council of Economic Advisers released a 1996 report stating that most new positions created in the 1990s paid above the average, the results were met with skepticism.[12]

As our study has shown, by focusing on what employees *do* instead of where they work, it becomes obvious that the office has changed the face of the workplace. The traditional industrial labor model of the economy has been replaced by the office, which accounts for almost 60 percent of the jobs for people with college degrees, 50 percent of all earnings, and most of the job growth in the last two decades.

In the past, most of the effort was concentrated on production—getting the product out the door. Productivity advances, especially in transportation and communication, led to economies of scale, larger organizations, and mass markets.

Today, further technological gains have made production much easier and more dispersed. Actual factory work, especially low skilled, has tended to flow toward countries with cheap labor, leaving behind the office to plan, manage, and coordinate the work.

At the same time, consumption is moving away from cheap, standardized goods to more customized products and services. The explosive growth of leisure and entertainment—restaurants, travel, health clubs, gambling, cable and satellite television, computer games and the Internet—has changed the mix of final demand, which drives the need for different types of workers. And heightened competition on a global scale has required firms to be much more agile in terms of marketing and positioning their products.

Also, as society has become richer, a larger proportion of the labor force has become involved with managing physical and monetary resources (employment in finance, insurance, and real estate firms has increased from 4.6 percent of the workforce in 1959 to 6.3 percent in 1995). Almost two-thirds of the "output" of these industries is directed to consumers rather than to businesses.

The new Office Economy is indeed different, but not like what many critics say. Labels like *service economy* are useless if "services" are defined as anything that isn't directly involved in producing goods; a category that includes both lawyers and waiters is far too imprecise. Similarly, the term *high-tech workers* should be avoided unless it is defined narrowly to mean science-based professionals and technicians, since high-tech is *not* synonymous with a professional or college education.

As our study demonstrates, the workers who are identified most closely with specialized "high-tech" skills have *not* been the ones whose paychecks have increased. Instead it is the managers, lawyers, doctors, and other business professionals who have caused the earnings of college-educated males to increase.

Calvin Coolidge's aphorism that "the business of America is business" is more true now than it was in 1925. Business *management* has become more crucial than ever, and the leaders of America's companies have set up new compensation schemes that have handsomely rewarded professionals, managers, and owners—with the definition of ownership extending far down the traditional office hierarchy.

But there are social consequences for this lean, efficient Office Economy, including—as our study shows—increasing hardship at the bottom of the tier, and many other implications for the future of the workforce.

Some points to ponder:

- **Technology is important, but as this study makes clear, *management* of technology (and its older cousin, production) is even more important.** This new Office Economy will reward the people who know how to deploy technology, integrate technology, and market technology. Better technology alone doesn't win by itself—the technically superior Macintosh computer operating system was crushed by the technically inferior Windows; the Beta videotape format was defeated by technically inferior VHS. The companies of the 21st century that are winners won't succeed simply by building a better mousetrap; they'll succeed with flexible organizational formats, technologies, and more flexible workers.
- **A new role (i.e., sink or swim) for organized labor, whose representation of the workforce has been dwindling for decades.** Today's office workers aren't likely to be excited by feather-bedding work rules or promotions based on seniority. But the idea of similar pay for similar work remains popular (remember that the gender gap is alive and well), and there's also that interesting European concept of more *vacation* every year. Unions also struck a chord with their campaign against part-time positions.
- **Provide more government protection for workers.** The new Office Economy thrives on flexibility. But for downsized workers, flexible is just a fancy word for fired. A flexible economy is inherently insecure. If workers are to be truly flexible, won't they need flexible benefits and access to lifelong learning, child care, and social support between jobs? If unions don't come back, doesn't the government become the union of last resort in responding to these demands?
- **A re-engineered, orderly, and "efficient" brave new world—one that not all of us will like.** Aldous Huxley's satirical 1932 novel, *Brave New World*, described a society in which individualism had been replaced by conformity, technology, and stability. Are his intelligent Alpha Plus leaders our new office in disguise? We applaud greater efficiency in health care, for example, but we don't like having bureaucrats decide whether we get two aspirins instead of an expensive prescription drug, or a pair of crutches instead of a new knee. Do we want more "efficient" decisions applied to inherently inefficient areas, such as management of parks and recreation? Should decisions on issues like food stamp eligibility really be turned over to private contractors? Should Texas prisons be run by firms that do very little screening when hiring guards at low pay?
- **New activism for government as the protector of consumer rights.** While many disapprove of public involvement in labor relations, there is widespread support for product safety, food quality inspections, and high environmental standards. Private profit-making decisions must be reined in to ensure that consumers do not unwittingly harm themselves or others.

These are just some speculative thoughts. We firmly believe that the new findings presented here can help scholars and public and private decision makers, educators, and trainers think more clearly about what the new Office Economy is—and what it is not. With a clearer understanding of the structure and trend lines of the American economic engine, we can all work together to make wiser investments. The *value* of higher education has been clearly established; students and parents, however, are demanding to know how they are going to put their learning to work. So, the answer to the question—*Education for What?*—is embodied in the new office jobs that require teamwork, networking, promotion, and management.

End Notes

1. Earnings are adjusted to constant 1996 dollars.

2. There is no single definition of prime age. The most inclusive age range runs from 25 to 64. A narrower range was used here—from 30 to 59—to focus on the experience of workers in the most stable years of their careers. Many 25- to 29-year-olds still have not found their permanent niche, while many 60- to 64-year-olds have already retired.

3. This gap is not affected by the huge salaries of corporate CEOs because reported earnings are capped at a maximum of $200,000 in 1995 and only $100,000 before that.

4. The increase in office employment and the decline of industrial production make measuring productivity more difficult. It is easier to produce the good, but more of the costs are now involved in managing the diverse inputs and production facilities and in promoting the product to find consumers. In this arena, style, quality, customization, and convenience have become important yet more difficult to measure as part of the final good or service.

5. Prominent exceptions include: Beniger, James R. 1986. *The Control Revolution: Technological and Economic Origins of the Information Society*, Cambridge: Harvard University Press; Chandler, Alfred Dupont. 1977. *The Visible Hand* and *Scale and Scope*, Cambridge: Belknap Press. A number of economic geographers have written monographs on service sector employment: Noyelle and Stanbeck come closest to investigating the office sector, which they call "complex of corporate activities." Their approach is more limited and, thus, their estimates of the office sector are considerably smaller. See Noyelle, Thierry J., and Thomas M. Stanbeck. 1983. *The Economic Transformation of American Cities*, Totowa, NJ: Rowman & Allanheld.

6. However, there are three major incongruities that violate the principle of putting similarly situated people in the same place: 1) Managers at fast-food restaurants and retail establishments function more like supervisors than corporate vice-presidents; in this study, they are listed with nonprofessional supervisors; 2) Stock and real estate brokers are combined with salesclerks in the government code, although brokers earn many times more, work far longer hours, and require college degrees. To correct this discrepancy, highly paid sales representatives and brokers are included with other business professionals in this study. 3) Police and firefighters are municipal employees who pride themselves on their professionalism; yet the official code places them in this category, along with janitors, fast-food workers, and health aides; as they fit more in the craft model of organization and skill, this study assigns them to the group of skilled blue-collar craft, machine, and repair workers.

7. As Gottschalk and Smeeding put it: "technological change [may be] simply a label for our ignorance." Gottschalk, Peter, and Timothy M. Smeeding. 1997. "Cross-National Comparisons of Earnings and Income Inequality." *Journal of Economic Literature*. (June). Vol. 35. No. 2:649.

8. Alan Krueger showed that those who work with computers earn more than comparable workers who do not ("How Computers Have Changed the Wage Structure: Evidence from MicroData 1984-89." 1993. *Quarterly Journal of Economics*. V. 108:33-60). But Dinardo and Pischke have cast doubts on these findings by showing that the same data set demonstrates that those who use pencils earn more than comparable workers who do not ("The Returns to Computer Use Revisited: Have Pencils Changed the Wage Structure Too." 1997. *Quarterly Journal of Economics*. V. 111 [February]). What most of the users of computers and pencils have in common is that they are office workers.

9. A new Commerce Department report finds that the shortage of information technology workers only appeared in the data in 1997, a date beyond the scope of this report. "America's New Deficit: The Shortage of Information Technology Workers." 1997. Office of Technology Policy. (Fall).

10. For a recent presentation of this issue, see Wooten, Barbara. 1997. "Gender Differences in Occupational Employment." *Monthly Labor Review*. (April). pp. 15-24.

11. In "On Shaky Ground: Rising Fears About Incomes and Earnings." 1994. National Commission for Employment Policy, Research Report 95-04, Stephen J. Rose showed that 86 percent of prime-age males and only 33 percent of prime-age females averaged over 1,750 hours per year during the 1980's.

12. See for example, Faux, Jeff. 1997. "The American Model Exposed." *The Nation*. (October 27). pp. 18-22.

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Leadership Series

Education For What?

The New Office Economy

Anthony P. Carnevale
Stephen J. Rose

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Education for What?
The New Office Economy

Technical Report

Anthony P. Carnevale
Stephen J. Rose

Educational Testing Service

Mail Stop 01-C
Princeton, NJ 08541
Voice (609) 734-5531
Fax (609) 734-1140

1800 K Street, NW, Suite 900
Washington, DC 20006
Voice (202) 659-8056
Fax (202) 887-0875

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Foreword

We at Educational Testing Service (ETS) are pleased to add this contribution to our understanding of how the modern economy works. We have been assessing the abilities of students and adults for more than 50 years and have often been asked the question —*Education for What?* This report provides some new answers to this question and should help the education community be more effective in its role of preparing citizens and workers to be full participants in America's future.

The changes in the American economy over the last several decades have been dramatic and sometimes disturbing. The news media have featured reports of stagnating family incomes, declining males' earnings, downsizing, and the difficulties experienced by displaced workers in finding comparable employment. Yet, our economy has generated over 25 million jobs since 1982, the stock market has soared, and inflation and budget deficits have all but disappeared. Further, the educational credentials of the labor force have gone up tremendously: In 1959, over half of prime-age workers had not finished high school, and only one-in-five had at least some postsecondary education. By 1995, only one-in-nine did *not* have a high school diploma—more than half had at least some college.

Few analysts have been able to integrate the good and bad news into a comprehensive story about economic change. Many people have used terms, such as "service economy" and "post-industrial society," to lament the loss of good-paying manufacturing jobs. For them, the vast majority of new jobs are low-skilled service positions that are low-paying and without a promising future. This report challenges such assertions by taking a fresh look at how the government and traditional economists classify jobs.

By focusing on what people actually *do* instead of what industry they work for (manufacturing, construction, professional services, finance, etc.), two senior members of the ETS Office of Public Leadership, Anthony P. Carnevale and Stephen J. Rose, have developed a new functional approach that combines all the activities of administration, coordination, and promotion into a broad new category—the Office.

We have found that office workers make up 41 percent of our workforce, but account for fully half of all earnings. And these office workers hold 65 percent of all managerial and professional jobs. In other words, *the new service economy is in the office.* And the low-skilled service sector represents only one-fifth of the labor force, essentially unchanged since 1959.

I commend this report to your reading and look forward to participating in the continuing dialogue on the issues it raises.

Nancy Cole
President,
Educational Testing Service

Part of a Larger Study

This study is the first in a series of reports on the skill requirements needed in a changing economy. These new labor needs are based on changes in the way goods and services are produced and in the composition of consumers' final demand. In addition, advances in communication and transportation have made the world a smaller place to do business. As the global economy has grown, there has been a convergence in what consumers in different countries want and expect and a specialization of tasks and abilities in different regions. We intend to look at other advanced countries to see if the office sector is as dominant and as rapidly growing elsewhere as in the United States. Finally, we will explore the nature of careers in the Office Economy by incorporating longitudinal data and by evaluating the cognitive abilities of different types of workers.

Acknowledgments

The authors would like to thank many people for assisting in producing this report. David Wright of the Department of Sociology at Wichita State University was responsible for the programming runs that generated the raw data from Census computer tapes. This task was quite complex and required matching occupation and industry codes in different years and translating the official categories into the functional and occupational groups presented here. The final preparation of the text—editing and fact-checking—benefitted from the assistance of Marlies Dunson, June Elmore, Neal Johnson, Barbara Koeppel, Jeff Strohl, and Graham Vink.

Authors' Views

This report was written by Anthony P. Carnevale and Stephen J. Rose of Educational Testing Service. The views expressed in this report are those of the authors and do not necessarily reflect the views of the officers and trustees of Educational Testing Service.

Introduction

As the economy has changed over the past several decades, concern has mounted about the nature and quality of employment opportunities. Stories in the mass media have chronicled the decline in the manufacturing sector and the rise of low-skilled services (hamburger flippers and their ilk). Citing growing economic inequality, declining wages, trade deficits, and downsizing, many commentators have proclaimed that the economy is in trouble, unable to generate enough jobs to support a family with children at a minimally adequate level.[1]

At the same time, however, various indicators point to an economic vibrancy:

- Total employment has grown by a whopping 25 million since 1982 (this contrasts with virtually no job growth in Western European countries);
- The unemployment rate has remained at or below 5 percent for the past two years;
- The budget deficit has all but disappeared, due to rising tax revenues;
- Consumer confidence has soared; and
- The stock market has climbed for 15 years.

In addition, the educational attainment of the labor force has risen dramatically. As recently as 1960, over half of prime-age workers (ages 30 to 59)[2] had not finished high school; fewer than 1-in-10 had received bachelor's degrees. Today, only 11 percent have not finished high school or received a General Equivalency Degree (GED); 28 percent have at least a bachelor's degree; and an additional 28 percent have some postsecondary education.

As the labor force has become more educated, the relative wage premium of college graduates over those with only a high school diploma has risen sharply.[3] In 1979, prime-age male high school graduates earned an average of $37,800 (in constant dollars), while those with bachelor's degrees earned $53,600, or 42 percent more.[4] By 1995, earnings for high school graduates decreased 18 percent to $31,000, while those of college graduates increased by 10 percent to $58,700. Thus, the premium for a bachelor's degree over a high school diploma rose to 89 percent.[5] Among female workers in 1979, high school graduates earned $16,400 while those with bachelor's degrees earned $25,500, or 56 percent more. By 1995, the respective pay levels were $18,200 and $34,000, or a pay difference of 87 percent.

The current way of thinking about the economy used by most researchers and the mass media has not enabled them to integrate the good news and bad news into a comprehensive story about economic change. It has not adequately explained how the economy has successfully incorporated the increasing number of college graduates.

[1] "Minimally adequate" is not precisely defined but is considered to be significantly above the poverty line. In the 1970s, the Labor Department estimated a "low budget" family income (described as minimum but adequate) that was about 75 percent above the poverty cut-off. The corresponding figure for a family of four in 1996 would be $28,000.

[2] There is no single definition of prime age. The most inclusive age range runs from 25 to 64. A narrower range was used here—from 30-59—to focus on the experience of workers in the most stable years of their careers. Many 25- to 29-year-olds still have not found their permanent niche, while many 60- to 64-year-olds have already retired. Some analysts use 25 to 54 as the 30-year prime-age span, but the earnings of 55- to 59-year-olds are significantly higher than those of 25- to 29-year-olds.

[3] Throughout the study, four exclusive groups of educational attainment will be used: "college-educated," referring to people who finished a four-year degree and those with graduate or professional degrees; "some college," referring to those without bachelor's degrees but who have completed some schooling beyond high school; "high school graduates," referring to those with exactly a high school diploma and no further education; and "high school dropouts."

[4] Earnings are adjusted to 1996 dollars.

[5] This gap is not affected by the huge salaries of corporate CEOs because reported earnings are capped at $200,000 (see Appendix discussion on top coding).

Rather, it is based on an industrial labor model in which the dominant economic activity is the production of goods, usually in large factories.

All activities that are not goods production are commonly included in a catchall category labeled services. Although many of the most-skilled and highest-paid workers are in this sector, service work usually is viewed as low paid and low skilled—e.g., salesclerks, janitors, waiters, and nurses' aides. Therefore, the decline in manufacturing employment is viewed as a cause for alarm. Or, as one team of authors noted, "manufacturing matters" because its decline results in the loss of many good jobs, and it indirectly hurts other industries because many high-paying design and marketing jobs are closely linked and also will disappear if production firms close (Cohen and Zysman, 1987).[6]

In place of the industrial labor model, we developed a new set of categories based on workplace *functions*. A benefit of this approach is that it combines all the employment in administration, supervision, finance, and promotion into a single group. These activities occur in specialty enterprises, such as management consultant and media relations firms, and in the office headquarters of industrial and service firms. And as will be shown, this functional group employs the most workers, accounts for the largest share of employment growth over the last several decades, is the primary source of employment for people with bachelor's degrees, and, consequently, pays the highest wages.

Because the traditional practice has been to classify a firm's employment by its industry (manufacturing, agriculture, personal services, wholesale trade, etc.), few have analyzed the business activities that cut across industries.[7] Consequently, the increasing importance of front-office tasks is not in official reports.[8] Since many researchers use changes in industrial employment as a cornerstone in their theory of economic development, they have missed this trend in what people *do* at work and the value added from those tasks.

To address this problem, the framework presented in this study is based on defining specific work tasks as "workplace *functions*." Within manufacturing firms, employment is divided into industrial activities (the workforce on the plant floor) and coordination activities (the front offices and national headquarters of multi-plant companies). The five major functions are:

Extractive production: direct labor in agriculture, mining, fishing, logging, and forestry;

Industrial production: direct labor in manufacturing, public utilities, construction, and transporting goods to market;

Low-skilled services: direct labor in performing consumer services that require limited training—e.g., barbers, retail clerks, and restaurant workers;

[6] There is much literature on America in decline. One best-selling book, *The Great Depression of 1990* (by Raveendra Batra in 1987), predicted a calamity, although none has occurred. Benjamin Friedman predicted a *Day of Reckoning* (1989) while Thurow (1996) foresaw the United States as a second-rate power by the second decade of the next century. Finally, other authors continue writing large tomes on this subject: see Donald White, *The American Century: The Rise and Decline of the United States as a World Power.*

[7] Prominent exceptions include Beniger's, *The Control Revolution: Technological and Economic Origins of the Information Society;* and Chandler's works, *The Visible Hand and Scale and Scope*, on the importance of organizational structure in determining economic success. A number of economic geographers have written monographs on service sector employment. Noyelle and Stanbeck (1984) come closest to investigating the office sector, which they call "complex of corporate activities." Their approach is more limited and, thus, their estimates of the office sector are considerably smaller. Joel Popkin (1993, 1996) also recommends alternative industrial and occupational categories to replace the current classificatory systems. Finally, Wolff (1996) tracks the growth of information workers by defining each detailed occupation code as either knowledge producers, data processors, service workers, or goods-producing workers.

[8] In terms of occupations, it is captured in the large growth in white-collar employment.

High-skilled services: direct labor in performing consumer services that require specialized training—e.g., health care, education, police, and firefighting;

Administration and coordination: all workers involved in management, administrative, business, and financial services.

This approach combines the nature of the final output and the internal division of labor within the firm. The first two functions represent goods-production, including investment goods, while the third and fourth functions deal with consumer services.[9] Each of these is defined narrowly to include only the direct labor necessary for performing the task. The fifth function combines all the activities of managing and coordinating private and public enterprises. Since most of these activities occur in offices, we have labeled this function the "office sector."

The traditional view of an office is a workplace dominated numerically by secretaries and other support personnel. But in today's Office Economy, business professionals—accountants, managers, sales representatives, and brokers—are the largest component, accounting for 44 percent of office jobs.[10] Since over half of these workers have their bachelor's degrees, the majority of the college-educated labor force (61 percent of prime-age male workers and 45 percent of prime-age female workers) was employed in office-related activities in 1995.

Overall, 40.5 percent of the labor force worked in the office sector in 1995 as compared to 30.4 percent in 1959. The causes of this growth were the small increase in the share of administrative activities in industrial firms, the larger growth in the headquarter's function of service firms, and the larger numbers of employees in firms that specialize in business services and financial management. This gain was more than offset by the decline in industrial labor from 33.5 percent in 1959 to 19.4 percent in 1995. Surprisingly, in the functional approach, the size of the low-skilled services sector did not change significantly, moving only from 20.5 percent of the labor force in 1959 to 21.6 percent in 1995. The remaining growth area was the high-skilled services sector.

In terms of shares of employment, office work, which was 3 percentage points behind industrial work in 1959, had a 21-percentage-point advantage by 1995. Obviously, this labor-market upheaval occurred over a number of years and was accomplished through the retirement of workers in the industrial sector and the hiring of new young workers in the office and high-skilled services sectors. At the same time, workers who were displaced before they reached retirement age had the greatest difficulty finding comparable employment, and many were forced to take jobs in the low-skilled services areas.

In 1995, workers in the office sector worked the most hours per year and were paid the most. Consequently, fully one-half of all earnings in the economy in that year went to office workers. The earnings of industrial workers, by contrast, equaled the national average (greater than average hours worked but less than average wages per hour), meaning that their share of earnings was identical to their share of employment (19.3 percent). So, in terms of economic impact as measured by total earnings, the office sector was ahead of the industrial sector by 30.7 percentage points!

The standing of office workers as the highest-paid applies to all gender and educational attainment groups. It has been argued that industrial work is particularly important as a source of good jobs for those without postsecondary education. However, in 1995 among high school-educated prime-age

[9] It is interesting to note that high-skilled services historically have been either government enterprises, nonprofit concerns, or regulated private industries.

[10] This group is defined differently in this study than in the official occupational coding of professionals and managers. Here, managers at food service and retail establishments are classified as supervisors, while high-skilled sales workers (e.g., stock brokers, sales representatives, insurance agents, and real estate brokers) are included among professionals. As a result, the office sector in 1995 employed 17 million clerical and support personnel and 23 million managers and professionals.

males, office workers earned 15 percent more than industrial workers. This premium has been almost constant since 1959 and also applies to males who have not finished high school and who have bachelor's degrees.

Many of these findings are unexpected because they don't fit easily into the industrial labor model. Yet, the landscape of our metropolitan centers is filled with large office towers comprised of banks, insurance companies, government centers, and firms specializing in professional business services. Further, although they were originally concentrated in the central business districts, space constraints and traffic congestion have led to one or more nodes of satellite office centers in outlying towns that are no longer just bedroom communities with retail strip malls.

Despite the obvious physical dimension of the growing office functions, most of the major books and articles that have affected the national economic debate have failed to give it the prominence it deserves.[11] For the most part, analysts have assumed that office work is only the superstructure atop a much larger industrial base. Traditionally, changes in the industrial base were considered the motivating forces in the economy, and the health of the office and service sectors was dependent on these more fundamental economic forces.

In this study, the new functional approach permits a fresh look at economic developments over the past several decades. Given the decline in manufacturing employment, the industrial labor model was bound to lead to mainly negative assessments. Some researchers struggled with alternative perspectives focusing on professional services. But the limitations of the data organized by industries made it impossible to measure the large expansion of the office sector. By breaking free from these blinders, this study establishes a new paradigm for the modern economy, with the dominant group being business professionals and managers.[12] As will be documented, it is their earnings that have grown while the earnings of others have stagnated or declined.

[11] Books such as *The Second Industrial Divide* by Piore and Sabel barely mention service employment and certainly do not discuss office work. In Levy and Murnane's *Teaching The New Basic Skills* (1996), three work sites are portrayed to represent the new economy: Two are in manufacturing and one is an insurance company.

[12] As Calvin Coolidge proclaimed, "the business of America is business." While this aphorism is not used as commonly as it once was, it certainly has not been appreciated in the discussion about the changes in the structure of the economy in the last few decades.

Part I: A Functional Approach to Economic Activities

Defining Functional Categories

Economists have developed three different classifications based on occupations, industries, and outputs to measure the nature of growth and change. Each asks different questions: What do workers do? What is the nature of a company's business? And what is the nature of the final product? Consequently, each economic act can be measured along each axis; for example, going to a fast-food outlet appears in economic accounts as going to a retail industry (part of the service sector), which is staffed by food-service workers (an occupational category) where food is consumed (classified as a nondurable good in output accounts). Table 1 presents the major subcategories within each of these approaches.

Because services are defined differently in each of these approaches, the size of this sector varies depending upon the gauge used. When measured by final output, services are those purchases in which a physical object does not change hands; in 1995, services were 56 percent of the total. However, when measured by the industry of the employer, 75 percent of the labor force were in service companies. Finally, only 14 percent were employed in service occupations, but most researchers include all white-collar workers as service workers. Using this expanded definition, 60 percent of workers fell into service occupations.

This confusion about the importance of services is rooted in the industrial labor model that limits the choice to either goods- or service-production. Given that services are defined as the residual—anything that is not directly connected to the production of physical goods—they lack internal consistency and meaning. Instead, services should be defined narrowly and should not

Table 1

Major Divisions Within Industries, Occupations, and Final Outputs

Industries	Occupations	Final Outputs
Agriculture	White-Collar	Consumption
Mining	Managers	Food
Construction	Professional	Clothing
Manufacturing	Technicians	Housing
TCU*	Sales	Medical
Wholesale	Clerical	Transportation
Retail	Blue-Collar	Personal Care
FIRE**	Craft	Business
Services	Operatives	Recreation
Business	Laborers	Education
Personal	Service	Religion
Entertainment	Protective	Government
Professional	Cleaning	Investment
Public Administration	Food	Exports
	Health	Imports

* Transportation, Communication, and Public Utilities.

** Finance, Insurance, and Real Estate.

include all white-collar workers nor should it include front-office administrative and executive tasks.

To avoid these inconsistencies, we developed a five-way functional division to classify economic activities. The approach differs fundamentally from other analyses in that employment within the same firm is divided into several functions: That is, only the direct producers in manufacturing are included in goods-production, while the administrative headquarters are put into a different category.

The five-way functional division includes two goods-producing functions and two consumer service functions.[13] Each of these four functions is defined narrowly to include only the direct labor needed to perform the task. The fifth function, the office, consists of all activities involved in managing public and private affairs. It combines the employment in front offices, in all of finance, insurance, and real estate (FIRE), in companies that provide services to other companies, in public administration, and in nonprofit membership organizations that serve a general public purpose. It is mental rather than manual labor; what might be called the "brains" of the economy.

The office function consists of all activities involved in managing public and private affairs.

Traditionally, the brains (or superstructure) were small relative to the body. But, this is no longer true in the modern American economy where jobs that perform the coordinating function are almost as numerous as those involved in the entire effort of producing goods and services.[14]

Since classification systems are somewhat arbitrary (they must allocate activities to a limited number of categories), some tasks have been assigned in ways that may not seem like a perfect match. For example, the office function includes both executives and secretaries. Using fewer categories is easier for presentation and comprehension but leads to combining more activities into the same group.[15] This dilemma is somewhat ameliorated in the more detailed version of the functional analysis in which there are 15 categories rather than 5 (see Appendix).

This study also characterizes the functions by the dominant work site within each category. These images are used to make the economic categories a bit more understandable. Because the entire economy is divided into five functions, more than one work site is present within each category.

Nonetheless, the advantages of adopting this approach outweigh the disadvantages. The prototypical work sites for each function are:

The farm: represents extractive industries;

The factory: represents industrial production;

The counter: represents low-skilled services;

The hospital/classroom: represents high-skilled services; and

The office: represents administration and coordination.

Creating the functions from the Labor and Commerce Departments' occupational and industry codes requires an elaborate set of procedures.[16] First, the official occupational codes have been reorganized into more consistent and functionally

[13] Some activities serve both consumers and businesses, e.g., travel and communication. To be consistent, the output share was determined for each of these industries between consumer and business services. The consumer part was allocated to either the low-skilled services function or the high-skilled services function, while the business part was allocated to the office function.

[14] In military theory, one of the keys to success is mastering the three Cs—command, control, and communication. Gordon (1996), however, focused on the controlling aspects of managers and argued that they played a large, negative role in the economy. Using a neo-Marxist approach, he connected corporate bloat to falling wages and low-productivity growth.

[15] Consequently, there are both high- and low-paid occupations within each function. For example, the industrial function contains minimum wage textile workers, unionized auto factory operators, carpenters, and even engineers in aircraft plants.

[16] The precise industry and occupational codes used in each year are available from the authors.

based groups, from the highest to the lowest earnings: Elite Jobs = managers and professionals; Good Jobs = supervisors, crafts workers, technicians, clerical workers, police, and firefighters; and Less-Skilled Jobs = operatives, salesclerks, service workers, and farm laborers (see Part II of this paper). Second, the product of each industry is aligned with a function (see Box below).[17] Third, within industries, front-office activities are separated from those that involve direct labor in producing goods or services. For example, in manufacturing industries, production workers include all blue-collar workers, technicians (operators of highly sophisticated equipment such as Cad-Cam machines), and science-related professionals (engineers, chemists, etc.); the remaining professional, managerial, and clerical workers are allocated to the office function.[18]

Decision Rules for Creating Five Functions

1. Supervisors and foremen do work and oversee others. As a result, they are divided equally between direct productive work and managerial/supervisory work, with the managerial/supervisory work assigned to the office function.[19]

2. Extractive production (the farm) includes all the direct labor in agriculture, mining, fishing, forestry, and logging. (In the official industrial codes, logging is in fact classified among manufacturing industries.)

3. Industrial production (the factory) is defined broadly to include all direct labor in manufacturing, construction, public utilities, and transporting and storing goods on their way to market. The non-manufacturing component performed by longshoremen, truck drivers, utility line repairers, and warehouse workers also are included in this function because the organization of work and skill levels are similar.

4. Blue-collar workers employed by temporary service agencies are allocated to the factory function.

5. Low-skilled services (the counter) represent those activities with direct consumer contact that do not require highly specialized training or a large physical capital base. In general, these personal contact jobs can be staffed flexibly by newcomers and part-timers. More than any other function, this category includes the dead-end jobs where there is little chance for high pay and mobility up a career ladder. There are exceptions, however. Some salesclerks in hardware stores and upscale clothing outlets earn considerably more than department store clerks. Within food services, McDonald's workers earn just above the minimum wage while the wait staff at elegant restaurants receive hefty tips. And while entertainment companies are staffed mainly by ushers and ticket takers, they also employ those on the stage or ball field.

6. Sales representatives are not included in the counter function because they are business professionals who promote their company's output to other companies. (They are allocated to the office function.) This job title should not be confused with salesclerks who sometimes call themselves sales representatives. The Census Bureau seems to distinguish successfully between the two in that sales

[17] Usually, this is not difficult, e.g., manufacturing industries produce goods. In the few cases where industries serve consumers and businesses, the relative shares are derived from the input-output table on final demand.

[18] Obviously, this procedure is inexact, and the employment shares and earnings levels should be considered estimates of functional differences.

[19] In the framework of population surveys in which each observation has a person weight, this procedure is accomplished by "creating" two persons out of one survey participant with each of the new persons having a weighting factor of one-half of the original level.

representatives earn nearly three times more than salesclerks and also have significantly higher educational attainment.

7. High-skilled services (hospital/classroom) consist of consumer services that require the effort of more skilled labor. The two major professional services that fall into this category are health care and education. The difference between these services and those in the counter function is reflected in the composition of their workforces. In 1995, only 4 percent of those in low-skilled services and retail were managers or professionals, and 76 percent were operatives, service workers, or helpers. Education was the most professionalized of all industries with 66 percent of those employed being managers or professionals and only 16 percent being among the less-skilled. The health-care industry was more diverse, as it includes medical doctors and registered nurses as well as licensed practical nurses and orderlies. Nonetheless, the distribution of employment was more professionally oriented than average for the whole economy: 39 percent of the employment was managerial or professional, another 14 percent were medical technicians, and 32 percent were among the less-skilled.

8. Personal transportation and communication services do not fall easily into either low- or high-skilled services. The physical capital requirements are high, e.g., phone lines, airplanes, trains, etc., and these industries employ blue-collar workers with medium skills and moderate pay. Consequently, the 1 percent of the labor force employed here is allocated to the hospital/classroom function.

9. Another high-skilled services activity is performed by police and firefighters. Because they deal with the public welfare, historically they have been employed within the public sector. In this approach, they were assigned to the hospital/classroom function, while other public administration workers were placed in the office function.

10. The office function consists of five components:

a) All managers and one-half of line supervisors involved in coordinating and supervising activities in industries producing goods or performing services.[20]

b) Employees in the entire FIRE sector. The output of these industries differs from consumer services and involves managing assets, whether personal or business.

c) Business professionals employed in the managerial hierarchy. There are almost as many employed here as in all of FIRE. Most of these workers are sales representatives, accountants, and the like. But there are also 1.6 million (out of a total of almost 4 million) science-related professionals who work neither in academia nor for manufacturing firms. These are often computer-related analysts servicing headquarters' activities.

d) Employees in public administration and nonprofit social service institutions. These workers perform coordinating functions at the communal level.

e) Support staff, primarily clerical and administrative, as well as janitors and other office help.

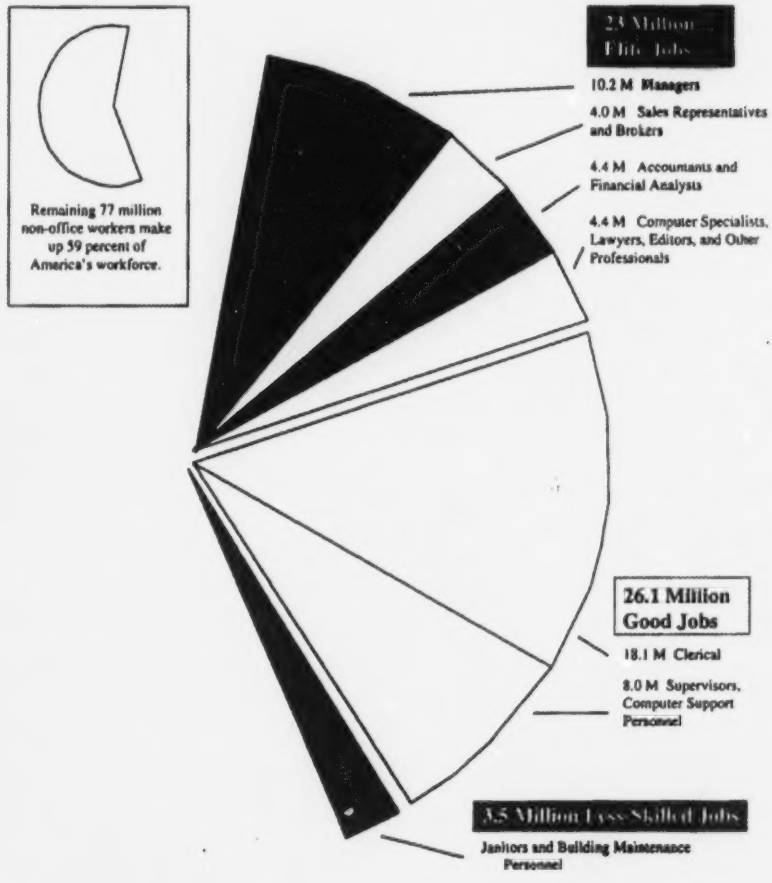
It is interesting to note that the share of the office function varied by industry in 1995. Retail trade and personal and entertainment services had the lowest concentration (20 percent) of front-office workers and mainly employed workers with low-level skills. In the goods-producing industries—agriculture, mining, manufacturing, and construction—approximately 30 percent of the workers were allocated to the office function. This ratio was slightly higher in health care, education, and other business service firms (consultants). One-half of the output of the Transportation Communication and Utilities (TCU) industries was directed toward business, so one-half of TCU employment was assigned to the office function. The remaining industries are themselves orga-

[20] In this approach, managers at food service and retail outlets are classified as line supervisors and not managers.

nized primarily as coordinating activities and, therefore, are almost entirely put into the office function: FIRE (100 percent), business services (73 percent), and public administration (67 percent).

Another way to look at the relationship between functional categories and the traditional occupational and industrial categories is to present the distribution of industries and occupations within functions (see Figure 1 below on occupational distribution of the office sector and the Box on the next page). Because the front-office managers and professionals are stripped from their original industry and put into the office function, these elite occupations are concentrated in two areas: 63 percent in office activities and 28 percent in high-skilled services (i.e., education and health care).

Figure 1
Who Are America's 52.6 Million Office Workers?
They make up 41 percent of the total workforce.


Remaining 77 million non-office workers make up 59 percent of America's workforce.
10.2 M Managers
4.0 M Sales Representatives and Brokers
4.4 M Accountants and Financial Analysts
4.4 M Computer Specialists, Lawyers, Editors, and Other Professionals
26.1 Million Good Jobs
18.1 M Clerical
8.0 M Supervisors, Computer Support Personnel
Janitors and Building Maintenance Personnel

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The Relationship of Industries and Occupations to Functions, 1995

Farm: Agriculture, fishing, and forestry industries made up 78 percent of the employment, with mining adding 16 percent and logging 5 percent. In terms of major occupations, 40 percent were farm laborers, 20 percent were farm owners and managers, 20 percent were operatives, and 10 percent were crafts workers.

Factory: Industrial production was divided among durable manufacturing (34 percent), nondurable manufacturing (24 percent), construction (19 percent), transportation and public utilities (12 percent), and wholesale trade (7 percent). Fifty-six percent of these positions were less-skilled operators, laborers, and helpers. Among those with more skills, 28 percent were classified as blue-collar crafts workers, 3 percent were technicians, 6 percent were science-related professionals, and 3 percent were supervisors who were partially allocated as production workers.

Counter: Two-thirds of the employment in this function was in retail industries (including food-service outlets) with most of the remainder being in personal and entertainment services. Another 6 percent were in repair and business services, which left 7 percent in professional services such as day care, residential care without nursing, and museums. There was more occupational variety than might be expected: 35 percent were service workers while 27 percent were salesclerks; 23 percent were blue-collar workers (8 percent of which were crafts workers), and 11 percent were supervisors assigned to direct service.

Hospital/Classroom: Educational and health-care workers were classified under professional services and dominated this category (83 percent). This left police and firefighters (from public administration) and personal transportation and communication workers to split the rest. This workforce was highly skilled with 50 percent being professionals: 15 percent health-related, 29 percent teachers, and 6 percent in other areas. Another 20 percent were medium-skilled health technicians, police, and firefighters. Twenty-one percent were service workers, and 9 percent were in other less-skilled occupations.

Office: This category was comprised of workers from many industrial areas: 19 percent were employed in the production-oriented industries of manufacturing, construction, mining, and agriculture; 15.5 percent were in FIRE, which is entirely allocated to this function; 9 percent were in public administration, 21 percent were professional service workers, and the rest were divided between other service and trade industries. The occupational structure of the coordinating office function was also diverse: 20 percent were classified as managers; another 24 percent were professionals; 15 percent were supervisors who were partially categorized in this function; 34.5 were clerical and administrative support staff; and 7 percent were less-skilled blue-collar and service workers.

Data Results: The Historical Evolution of the Five Functional Categories

The economic impact of each function can be calculated in several ways. The simplest way is to count the number of people in each function, based on their longest-held job in the previous year.[21] This method is somewhat problematic in that it does not distinguish between full-time, full-year workers and high school students working a part-time job over the summer. Still, it does reflect the overall nature of employment and is a useful indicator of the types of jobs available.

This measure can be adjusted by the amount of time worked to obtain the number of full-time equivalents in each category. Or, it can be broadened by including pay received. Instead of presenting the share of employment within each function, the measure becomes the share of total earnings. Assuming that pay reflects productivity, the earnings share comes closest to assessing the overall economic impact of each function.[22]

Another issue is whether the reference group is the entire labor force or just workers in their prime working years. In our study, the latter approach is often used because young and old workers have less connection to the labor force. Many young workers are not yet fully committed to full-time employment and are either working while still in school or exploring different options. On the other end of the age scale, some older workers have reduced their hours significantly or are working part-time to add to their retirement income. Knowing what is happening to the labor force as a whole is appropriate for answering some questions, but to evaluate labor market success and failure, limiting the analysis to prime-age workers in the midst of their career jobs is more appropriate.

It is important to note that the labor market experiences of males and females remain quite different. One reason is that many fields, such as construction, crafts, and secretarial work, are still segregated by gender. Even within broad occupational categories, females are concentrated in certain areas. Among professionals, females tend to be in elementary education, nursing, and social work.[23] In addition, females are still mainly responsible for child care and other family maintenance and often have interrupted employment histories.[24] Thus, they earn considerably less than males who have the same level of education and perform similar tasks.

The labor market experiences of males and females remain quite different.

Another important difference is educational attainment. As noted earlier, the relative earnings of workers with more years of schooling have risen despite a large increase in the number of college-educated people. Thus, this study analyzes prime-age workers by four levels of education: Those who do not complete high school, high school graduates, those who have some college, and those with at least bachelor's degrees.

Figure 2 (following page) demonstrates the substantial change in employment shares in each of the five employment categories. Both goods-producing sectors declined sharply. Raw material production was already the smallest sector at 5 percent of employment in 1959 and declined

21 Workers who report holding multiple jobs (at the same time or at different times during the year) are not accurately allocated if their employment outside of their longest-held job is in a different function. It is doubtful, however, that this biases the results one way or the other.

22 Given that uncounted employer benefits are not universally available, there may be some bias introduced. However, the office function has the greatest concentration of managers and professionals, so its share of earnings underestimates the total resources devoted to these workers.

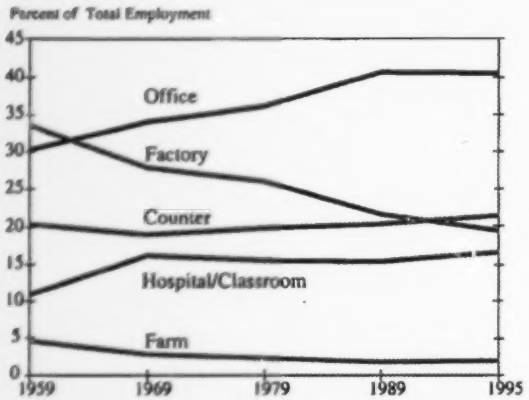
23 For a recent presentation of this issue, see Barbara Wooton, "Gender Differences in Occupational Employment."

24 In previous research, Rose (1994) showed that 86 percent of prime-age males, while only 33 percent of prime-age females, averaged over 1,750 hours per year during the 1980s.

steadily to only 2 percent by 1995. Although consumers spend close to 15 percent of their budgets on food, only 1 percent of the workforce produces it. Processing, packaging, sales, and restaurants are responsible for the bulk of the food costs. In fact, the Office of Technological Assessment (1988) estimated that it took more secretaries than farmers to bring food to the American table. Further, agricultural productivity is so high that much of what is produced is exported.

Figure 2

Office Employment Has Grown to 41 Percent of All Jobs



The 14-percentage-point decline in industrial production (which accounted for slightly more than one-third of all workers in 1959 but fewer than one-fifth by 1995) represents a major restructuring of the economy. Instead of being the largest function, it slipped to third place. The decline was steady and even continued from 1989 to 1995. Moreover, all three subcomponents experienced large declines in their share of employment. Low-wage manufacturing industries dropped the most, accounting for 9.6 percent of the workforce in 1959, but only 4.2 percent by 1995. Conversely, the relative size of high-wage manufacturing dropped by about 40 percent (from 13.7 to 7.3 percent) while nonmanufacturing employment (predominantly construction) only declined by about one-quarter (10.3 to 7.9 percent).

The combined goods-producing functions only accounted for 21 percent of employment in 1995. There are two things of note about this number and its decline. First, had the labor market division of 1959 continued, there would have been an additional 20 million workers in industrial or extractive production in 1995. This is a rough estimate of the amount of job shifting that occurred because of changing employment patterns. Second, the share of goods consumption in final demand (almost one-half) is much greater than the share of the workforce needed to produce it. In other words, there are now more "services embodied" in material production than direct physical labor.

Somewhat surprisingly, the low-skilled services category did not move significantly. Initially, its employment share declined from 20.5 percent of the workforce in 1959 to 19.2 percent in 1969 and rose to 21.6 percent by 1995. The initial decline was driven by a decrease in personal service employment, in particular, the drop in employment of African American housekeepers. After 1969, growth in the retail component, which includes restaurants, led to a slow increase in the share of these activities.

The high-skilled services category grew unevenly. Accounting for 10.9 percent of workers in 1959, its share rose sharply to 16.2 percent by 1969, then declined slightly over the next 20 years to 15.5 percent. But, in the 1990s, the category rose again, reaching its maximum of 16.5 percent. In terms of components, employment in health care grew steadily from 3.7 percent of the workforce in 1959 to 6.7 percent in 1995; while in education, employment increased from 5.6 percent in 1959 to 8.7 percent in 1969 and decreased to 7.6 percent in 1979. The baby-boom effect—boom then bust—is evident; further, the boom echo and expanded college enrollment caused employment in education to rise to 8 percent in 1995.[25]

The biggest gains were in the office function, which rose from 30.4 percent of workers in 1959

[25] In 1997, there was a record enrollment in public elementary and secondary education. Given the persistence of the baby-boom echo effect and the retirement of many existing staff, two million new teachers are expected to be hired in the next few years.

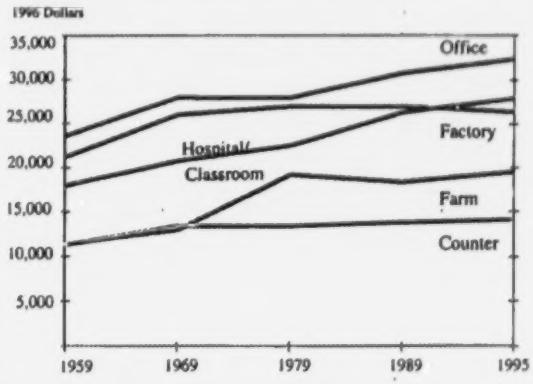
and stabilized at 40.6 percent by 1989. In so doing, it moved from the second largest category (slightly smaller than industrial production) to the largest by far in 1995, outscoring the next one by 21 percentage points. The 10-percentage-point increase translates into 14 million more workers in the office category than there would have been if the 1959 pattern had continued.

Another way of showing that office employment is the main source of new employment is by tracing its share of net job growth. Of the 69 million new jobs that have been created since 1959, 34 million are office workers (49 percent). Between 1979 and 1995, 26 million new jobs were created, of which 15 million (59 percent) were office workers. Much of this growth was concentrated in the 1980s. The share of office employment among new jobs in the 1990s was only 39 percent.

The drivers of this growth can be determined by looking at the components of this function. There was steady growth in the share of managers, increasing from 5 to 10 percent. Also, employment in FIRE grew significantly and steadily, as did the number of supporting business professionals. Both of these groups increased their employment share by 2 percentage points. The share of support staff, however, grew slowly from 13 to 14 percent from 1959 to 1989 before declining to 13 percent in 1995. Finally, public administration employment followed a similar pattern, increasing from 4 to 5 percent from 1959 to 1979 but then declining to 3.8 percent in 1995. So, virtually all the growth was concentrated among highly paid managers and business professionals.

In terms of pay, the office function, which has a high concentration of managers and professionals, has always been the highest paying. Despite a lull in the 1970s, their earnings continued to rise over the entire period (see Figure 3). Conversely, the relative position of industrial production workers declined. In 1959, they earned the second highest wages (just 11 percent behind office workers). Their earnings remained stable until 1979, after which their pay declined until they were 20 percent behind office workers in 1995. Further, they lost their advantage over high-skilled service workers, falling to third place in the earnings order.

Figure 3
The Highest Pay Is in Office-Related Activities



The earnings of high-skilled service workers increased substantially. Despite having the highest level of schooling, their pay in 1959 was 5 percent below the average for all workers, while office workers earned 24 percent more than average. Among those with bachelor's degrees, teachers were the lowest-paid subgroups, while health-care workers were just below the average. However, as more options opened for females and the health-care sector grew in size, the pay in this area grew steadily. By 1995, earnings were 6 percent above average and were only 15 percent below that of office workers (versus a 30 percent difference in 1959).

Earnings in the counter function have been almost flat over the whole period. This area, more than any other, has reorganized its staffing patterns. In 1959, 27 percent worked part-time, but this figure increased to 39 percent in 1995.[26]

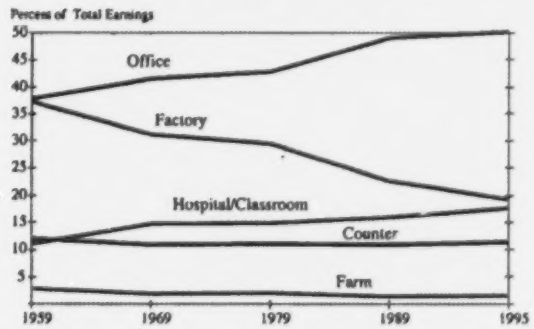
Finally, the rise in earnings in extractive production reflects the drop in the number of

[26] We can't track the average hours worked over time because the answers to the hours-worked question were categorical ranges rather than specific numbers. In 1995, however, counter workers worked 1,487 hours per year versus 1,822 for all workers.

agricultural workers, the omission in Census surveys of many migrant workers, and the greater prevalence of mining and logging workers within this function.

The share of total earnings combines the share of employment with the relative pay level. Because the office function is the highest paid, its 41 percent share of employment in 1995 translated into exactly 50 percent of the earnings of all workers (up from 37.8 percent in 1959). Conversely, the earnings share of factory workers dropped from 37.1 to 19.3 percent. These two movements are represented by the sharply inclining and declining lines (that start from almost identical positions in 1959) in Figure 4.

Figure 4
Fifty Percent of All Earnings Now Go to Office Workers



The low-skilled services share remained virtually constant at 12 percent. While the share of the extractive production category declined, it was at such a small level in 1959 that it did not make much difference (from 2.8 to 1.4 percent). The largest relative gainer (moving from 10.4 to 17.6 percent) was the high-skilled services category, which increased in relative pay and accounted for a greater share of employment.

Since the functional categories are different from the traditional industrial categories, the change in employment shares over these 36 years can be explained by shifts within and between industries. A within-industry change occurs when the division of labor inside a company occurs—e.g., the share of front-office employment rises. A between-industry change is caused by the differential growth of various industrial sectors of the economy.[27]

All industries had increasing concentrations of office activities, meaning that the within-industry effect is positive for the office function and negative for all others. Therefore, all of the remaining changes were caused by between-industry movements. For example, only 3 percent of the 14-percentage-point decline in the factory function from 1959 to 1995 is explained by the within-industry shift to more office work. In the two service functions, there was a smaller shift to front-office activities, implying that their change in employment shares was driven by between-industry demand effects.

Consequently, of the 10-percentage-point increase in the office function, two-thirds were due to the within-industry effect (shift to headquarters) and one-third was due to employment gains in industries that were heavily oriented to office functions. In terms of the gains within subfunctions, over half (5.6 percentage points) were due to the increase in the employment share of managers and supervisors. This movement to managerial labor continued in the 1990s despite repeated news stories about downsizing. While some middle management may have lost jobs in some firms, they registered larger gains in others. However, these gains were offset by an equally large decline in the share of support labor; it appears that restructuring and new computer technologies for information retrieval and word processing negatively affected lower-level white-collar workers.

Other coordinating activities gained in importance over the last 36 years. Employment in FIRE industries grew steadily through 1989—up from 4.5 percent of all workers in 1959 to 7.0 percent

[27] The between-industry movement is often driven by changes in relative demand for different final outputs. This issue will be explored in greater detail in the next study of this series.

in 1989—before falling slightly in the 1990s to 6.6 percent in 1995. This still left a net gain of 2 percentage points over the entire period studied.

Business professionals (sales representatives, inspectors, accountants) are another group that benefitted from the remixing of employment within industries. Their share of overall employment grew slowly from 1959 through 1979, but then grew quickly thereafter from 3.9 to 5.9 percent. Virtually all of this gain was due to changes of employment within industries rather than between industries.

Prime-Age Workers

All of the previous calculations were based on the entire experienced labor force. Seventy-one percent of earnings, however, went to workers between the ages of 30 and 59. These people are in the middle of their careers, have the highest likelihood of being employed full-time and full-year, and have twice the average yearly pay of non-prime-age workers.

Figures 5 and 6 trace the distribution of functional employment of prime-age males and females from 1959 to 1995. Neither were very likely to work in extractive production functions. Only 1.6 percent of prime-age females were in this category in 1959, which then declined to 0.7 percent in 1995. For males, the starting point was 6 percent of workers, falling to 3 percent.

Industrial production accounted for almost half of male workers (45 percent) in 1959 but only 1-in-5 females. But over half the females were in low-wage manufacturing industries as opposed to one-fifth of the males. By 1995, the employment shares of both had declined sharply. Nearly 1-in-3 males (31 percent) and 9 percent of females were industrial workers. Thus, factory work was still the second most likely employment field for males, although it had declined to fourth for females.

Figure 5
Even Among Prime-Age Males, There Are More Office Workers Than Industrial Workers

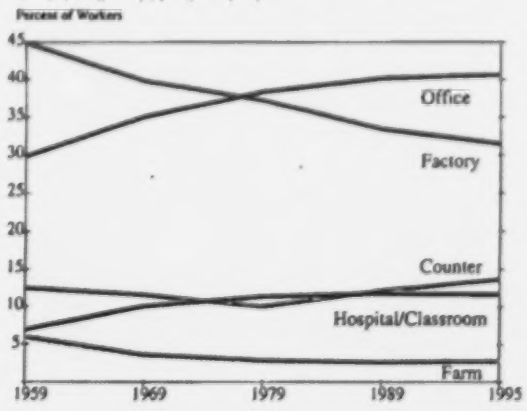
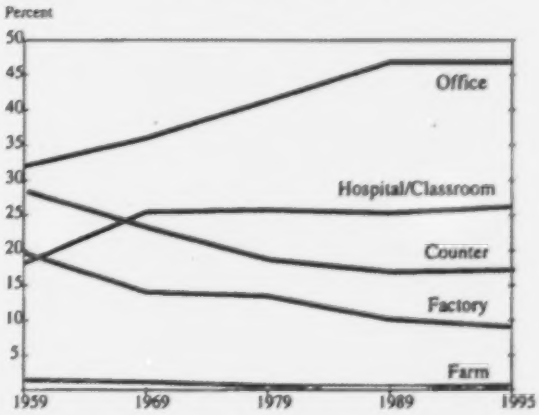


Figure 6
Prime-Age Females Have Been Increasingly Employed in the Office



The movement in the low-skilled services areas is somewhat surprising. For working females, the share of these counter activities declined sharply from 28 percent in 1959 to 17 percent in 1995. This 11-percentage-point decline equaled the size of the decline of females in industrial jobs, meaning there was quite a shake-up in females' job opportunities. For prime-age males, the share of employment in this area declined from 13 percent in 1959 to 10 percent in 1979, and then increased to 13 percent in 1995. Consequently, by 1995, there was a tremendous convergence in the share of males and females holding these jobs: A

16-percentage-point difference shrank to 4 percentage points.[28]

In the other high-skilled services sector (the hospital/classroom), females were always more represented. For both sexes, there was a sharp rise in employment from 1959 to 1969 and then a slow increase in the ensuing 26 years. Females' share of employment in this area rose from 18 percent in 1959 to 26 percent in 1995, while for males, the increase was from 7 to 12 percent. This was the second largest area of employment for females but the fourth for males. As we will see shortly, this sector provided most of the jobs for female college graduates up through 1989.

In 1959, male office employment lagged behind industrial employment by 15 percentage points; by 1995, the positions were reversed.

In 1995, the office sector was the largest employer for both genders—47 percent of females and 41 percent of males. This sector always had been the number one female employer with its share growing from 32 percent in 1959. Virtually all of this growth was in elite jobs. Among female office workers in 1959, 80 percent were clerical and support workers, and only 13 percent were managers and professionals. By 1995, the share of managers and professionals almost tripled to 31 percent, while the clerical share declined to 38 percent. The opportunities open for female managers and supervisors were stark. In 1959, only 2.1 percent held these jobs, but by 1995 the figure was 9.5 percent.

As Figure 5 shows, the change in employment patterns for males since 1959 was great. Employment in office jobs increased from 30 to 41 percent with this gain being offset by a decrease in factory jobs. In 1959, office employment lagged behind industrial employment by 15 percentage points; by 1995, the positions were reversed, and the office employment share was 10 percentage points higher. Furthermore, male workers in this field tended to hold elite managerial and professional jobs (59 percent of the total).

It should be noted that the functional distribution of young (21 and under) and old (62 and over) workers was very different from the figures just cited. In 1995, nearly half were in low-skilled services (as compared with 1-in-7 for prime-age workers). Further, although these workers constituted 16 percent of the experienced labor force, they held one-third of the counter jobs. In earlier years, fewer younger and older workers were concentrated in this category because more jobs were available in industrial production.

In terms of average annual earnings and hours worked of prime-age workers, males worked 2,173 hours and brought home $39,825 in 1995, while females earned $23,189 for 1,784 hours worked. As females have become more consistent members of the paid labor force, the gender gap has shrunk. Annual earnings in constant dollars in 1959 were $12,205 for females and $27,932 for males. Consequently, males earned 134 percent more in 1959, but only 72 percent more in 1995.

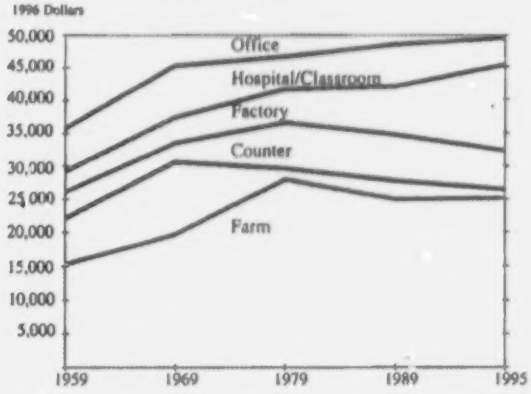
The ranking of male earnings by functional category over time remained the same (see Figure 7, following page). Those in the office were always the highest paid, followed by those in high-skilled services, industrial production, low-skilled services, and extractive production.

However, the wage gap between office and industrial workers is particularly interesting given the focus on the latter in the good jobs/bad jobs debate. In 1959, males in the office category earned 37 percent more than those in industrial production; this premium dropped to 28 percent in 1979 before exploding to 53 percent in 1995.

[28] The anomaly of the overall service-sector share not changing very much while the share of females in this category declining rapidly is explained by the greater prevalence of female workers in the labor force. As females' share of employment rose, their higher-than-average participation in this area offset their decline in the share of females' counter employment.

While office earnings continued to move ahead, industrial workers experienced earnings gains reaching $36,591 only through 1979; by 1995, their average earnings had dropped to $32,302.

Figure 7
For Prime-Age Males, the Highest Salary Is Found in the Office



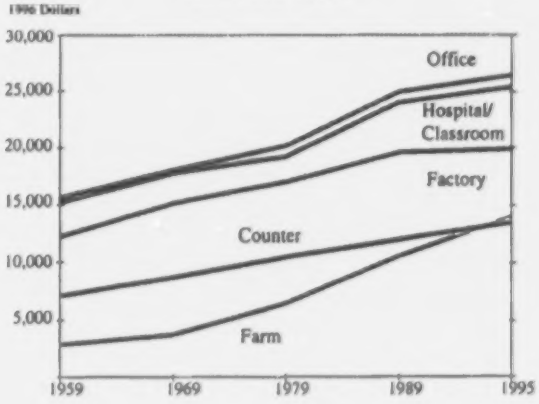
Another group that followed the pattern of gains then declines were male counter workers. Their maximum pay of $30,555 was reached in 1969, followed by a steady decline to $26,414 in 1995. At this level, these workers earned slightly more than one-half the amount prime-age male office workers earned in 1995.

The functional ordering of female workers' earnings also was stable and similarly ranked as males (see Figure 8). Once again, office workers were the highest paid, followed closely by hospital/classroom workers.

Since employment in these two functions accounted for nearly three-quarters of prime-age females' jobs, this reflects a remarkably stable set of opportunities. Female factory workers also experienced steady wage gains, but the increase was at a much slower rate after 1979. As a result, the office/factory gap was 18 percent in 1979 before increasing to 33 percent in 1995 (a level significantly less than the difference among males).

Another way to look at earnings is by the shares of high-earners and low-earners within each category. Averages can sometimes be deceiving because of the presence of a few very high values. Consequently, high-earners are defined as those making more than $50,000 a year and low-earners as those making below $20,000 (adjusted to 1996 dollars).

Figure 8
For Prime-Age Females, Office Workers Earn the Most



Among prime-age males in 1995, slightly more were high-earners than low-earners (25.4 to 24.8 percent), leaving almost exactly half in the middle. High earnings were most prevalent among office workers (37.5 percent) and high-skilled service workers (30 percent). Fewer than 1-in-6 industrial workers (16 percent) earned more than $50,000, while only 1-in-10 counter and farm workers reached this level. Not surprisingly, the share of low-earners is the reverse pattern: One-in-two counter and farm workers dropped below $20,000, while 27 percent of male industrial workers fell into this group. Relatively few male hospital/classroom workers or office workers failed to earn more than $20,000 (20 and 15 percent, respectively).

The change over time in high and low shares is quite revealing. From 1959 to 1969, earnings rose sharply with the share of high-earners more than doubling (from 7 to 18 percent) and the share of low-earners falling (from 29 to 16 percent). From 1969 to 1979, the average earnings of prime-age males increased slightly, driven entirely by a rise

in the share of top earners (up to 27 percent of males). But the share of low-earners increased by 1 percentage point, which marked the beginning of the trend of greater economic inequality among male earnings. In 1979, 1989, and 1995, average male earnings were almost flat, but the share of low-earners continued to rise, almost reaching 1-in-4 by 1995. The share of high-earners reached its maximum of 28 percent in 1989 before losing almost 3 percentage points in the 1990s.

The rise in the share of low-earners was particularly large for industrial workers (from 16 percent in 1969 to 27 percent in 1995) and for counter workers (from 27 to 46 percent). Not surprisingly, these fields had fewer opportunities for high pay and their average pay declined as a result of this shift. The rise in the share of low-earners was less dramatic for office workers (from 12 to 15 percent) and hospital/classroom workers (from 13 to 19 percent). Nonetheless, the average earnings of workers in these functions increased during these years because of the rising pay of the highest earners.

Female workers, on the other hand, were much more likely to be low-earners (51 percent) than high-earners (7 percent). Although considerably behind their male counterparts, these numbers reflect a marked improvement from 1959 when only 0.3 percent of prime-age females earned more than $50,000, and 4-out-of-5 fell into the low-earning group. Most of this gain was accomplished by 1989, with only small improvements in the 1990s as average female earnings went from $12,200 in 1959 to $21,800 in 1989 to $23,200 in 1995.

Although the share of low-earners among females had declined, it was still high in several of the functional areas. Among female counter workers, 4-out-of-5 made less than $20,000 in 1995, but 62 percent of industrial workers also did not reach this standard. In the office category, 41 percent were low-earners, as were 45 percent of hospital/classroom workers. On the other side of the divide, high earnings among females were limited to office workers (9 percent) and high-skilled service workers (8 percent).

Employment, Earnings, and Education

During the last several decades, the level of educational attainment increased steadily as more educated young workers replaced less-educated retiring workers. In 1959, 57 percent of male and 50 percent of female workers had not completed high school or received GEDs. By 1995, the figures had dropped to 12 and 9 percent, respectively.

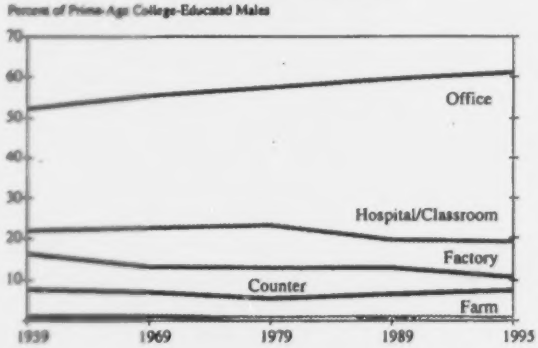
Conversely, the share with at least a bachelor's degree increased steadily from 9 to 25 percent, and those with some college education rose from 12 to 29 percent; thus, well over half had at least some postsecondary education. The remaining group, high school graduates with no further schooling, increased from 28 percent in 1959 to 40 percent in 1979, before declining to 32 percent in 1995.

The second part of this paper will show that educational preparation is very important in determining occupation. In particular, the increase in college-educated workers is reflected in the higher number of managers and professionals. Since a strong connection exists between functional employment and professional occupations, education is also correlated with functions.

Although their numbers increased dramatically, the distribution of college-educated males among the functional categories changed very little (see Figure 9, following page).

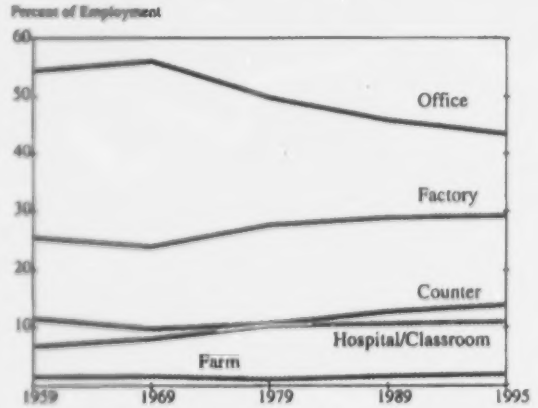
The office was always their main place of employment and even increased from 52 percent in 1959 to 61 percent in 1995. The share of health-care and educational professionals declined from a high of 22 percent in 1979 to 17 percent in 1995, while the share of engineers and other science-based professionals in industrial production also decreased from 16 percent in 1959 to 10 percent in 1995.

Figure 9
The Majority of College-Educated Males Become Office Workers



Males with some college, but not a bachelor's degree, actually bucked the overall economic movement to office employment (see Figure 10).

Figure 10
Fewer Prime-Age Males with Some College, but Not a Four-Year Degree, Are Office Workers

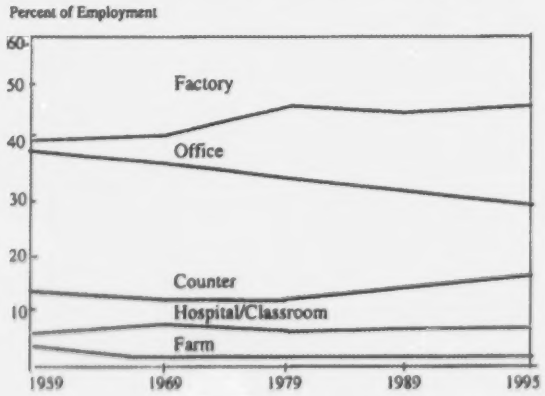


In 1969, 57 percent of these males were employed in the office sector. But as more workers finished four years of college, the relative standing of those with less than a four-year degree dropped. Consequently, the coveted professional office jobs became less available to those with some college—just 41 percent were employed in this function in 1995.

This decline was offset by an increase in their share in industrial production—from 24 percent in 1969 to 31 percent in 1995. Thus, despite the overall decline in the importance of industrial jobs, males with some college were more likely to be employed in this function in 1995 than they were before. These workers were still employed more in offices than in factories, but the gap narrowed considerably (from 33 percentage points in 1969 to 10 percentage points in 1995).

The situation of high school graduates was similar to that of male workers with some college. While industrial production was always their main source of jobs, it became even more important after 1969, and their share stabilized at 45 percent (see Figure 11).

Figure 11
For Males with Only a High School Diploma, Factory Work Is the Prime Source of Employment



Again, their share of office employment declined, as jobs were filled by the rising ranks of college-educated workers. After 1969, their relative education standing declined, and their share in office employment declined from 38 to 29 percent by 1995.

Interestingly, not many male high school graduates nor those with some college were employed in high-skilled services. The share of those with some college rose from 8 to 11 percent, while the share of high school graduates fluctuated at around 8 percent. In a similar vein, employment in low-skilled services was not that substantial for these males, although a small increase was registered for both groups: 12 percent in 1959 and 14 percent by 1995 for males with some college, and

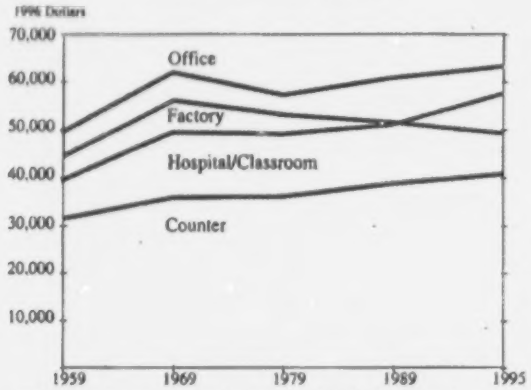
13 and 16 percent, respectively, for high school graduates.

For prime-age males who did not finish high school, industrial employment had always been the primary source of jobs. Starting with 55 percent of employment in 1959, its share rose slightly to 57 percent in 1979 before falling to 49 percent in 1995. The entire decrease after 1979 was absorbed by greater employment in counter functions—increasing from 13 percent in 1979 to 22 percent in 1995. Their share of office employment was steady, moving between 17 and 18 percent over the period studied.

The earnings of males vary by category of employment, even for those with the same level of education. For example, among males with bachelor's degrees (see Figure 12), the earnings gap between office workers and science-related professionals, such as engineers and chemists in factory settings, remained at about 10 percent from 1959 to 1979. But over the next 16 years, earnings of those in factories declined by more than 10 percent, causing the office worker premium to increase to 28 percent.

Figure 12

For College-Educated Males,* Earnings Are Highest in the Office



*Excludes the very few males employed in the farm function.

The earnings of college-educated men in the high- and low-skilled services increased consistently over the same period. The pay of medical and educational professionals rose by 46 percent, which moved them to a close second behind office workers. For the relatively few males in low-skilled services who have bachelor's degrees, the pay was always significantly below the other sectors. Thus, they only gained relative to industrial workers and lost ground to high-skilled service workers.

The experience of males with other levels of education was remarkably similar. First, all saw their earnings decline in the later years. While the pay of males with bachelor's degrees rose modestly from 1969, the 1995 earnings of those with only some college were 14 percent below their 1969 level. Those without any postsecondary education reached their earnings' peak in 1979, but experienced a much steeper decline through 1995: 18 percent for those with diplomas and 25 percent for those without them.

Second, at all educational levels in all years, office work paid the most. Even in 1995, males with or without high school diplomas had 16 percent higher pay than those who worked in industrial settings.[29] For males with some college, the office work premium was slightly higher (21 percent) in 1955. With the passage of time, the top standing of office work remained, with the gap in relation to factory work closing a bit through 1979, and then returning to its earlier position. The reason for the office premium, even for those with no postsecondary education, was their employment in elite jobs (managers, supervisors, sales representatives) if they were employed in the office.

Third, the earnings of males without bachelor's degrees declined over time within each functional group. The level of decline was not uniform; it was highest in counter employment and lowest in high-skilled services. Consequently (with the exception of high school dropouts), the hospital/classroom pay was the second highest to office employment, exceeding factory work by 1995. This decline within each functional category was reinforced by the mix effect—fewer workers in the higher-paid office sector, leading to the

[29] It should be remembered that blue-collar supervisors are allocated equally between the industrial and office (supervising) functions. As a result, they do not affect the earnings comparison between these two areas.

drop in earnings for males at different educational levels short of the baccalaureate.

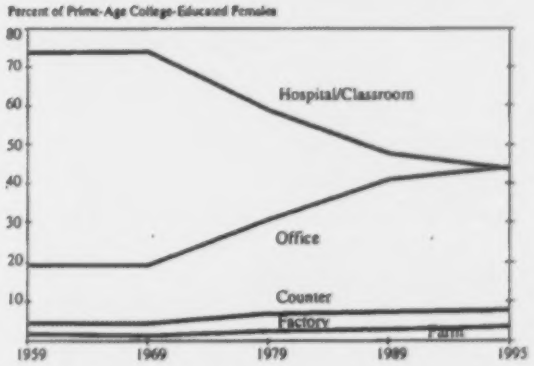
When exploring the employment distribution and earnings of prime-age females, it is evident that they are concentrated in fewer job titles, are virtually absent in extractive production, and are scarce in industrial production. Thus, most of the comparisons between females and males are limited to the three other functions.

Further, as females have become more permanent members of the labor force, their earnings have risen steadily. For example, the earnings of females with bachelor's degrees increased from $20,800 in 1959 to $34,000 in 1995. Females who do not have bachelor's degrees reached their maximum in 1989, losing some ground in the 1990s. Nonetheless, females with some college increased their earnings by 50 percent from $15,000 in 1959 to $22,600 in 1989 (before declining to $22,500 in 1995); for high school graduates the three earnings levels were $13,100 in 1959 to $18,300 in 1989, and $18,200 in 1995. Finally, female high school dropouts experienced the smallest gain over time, going from $9,600 in 1959 to $12,700 in 1989, and $12,300 in 1995.

For females with bachelor's degrees, job opportunities expanded remarkably (see Figure 13). As recently as 1969, 74 percent were in the high-skilled services, mainly as nurses and teachers. Most of the others were in the office function, but half were in clerical positions. By 1995, the share in office work edged ahead of the high-skilled services category (44.9 to 43.9 percent), with the gain occurring in professional jobs. In 1959, only 2.9 percent were managers, before rising to 13 percent in 1995. The share of female business professionals (which includes accountants, brokers, and sales representatives) also increased from 2.4 percent in 1959 to 9.5 percent in 1995.

Accompanying this "sea change" in employment options for college-educated females was rising pay. Those in hospital/classroom jobs saw their earnings increase from $21,500 in 1959 to $33,500 in 1995. The gain for office workers with advanced schooling was more impressive, almost doubling from $19,700 to $36,400. Thus, they earned about 10 percent less than those in high-skilled services through 1969, but by 1995, office workers earned 10 percent more.

Figure 13
College-Educated Females Have More Opportunities Than Ever Before



Employment for females with some college was always concentrated in office work, particularly in clerical jobs. In 1959, 42 percent were in this function, while 34 percent were in high-skilled services. Over time, more managerial and professional office jobs opened up, leading to 55 percent of females' employment in this category. The gain was offset by a decline in the share of hospital/classroom jobs, from 34 to 26 percent, while the share in low-skilled services was steady at 14 percent.

The compensation for females with some college in the three functional areas remained in a virtually constant relationship—growing steadily through 1989 and then edging up just slightly in the 1990s. Female office workers with some college earned $16,800 in 1959 and $24,900 in 1995. Throughout these years, office workers earned approximately 15 percent more than their counterparts in the hospital/classroom category, whose earnings increased from $14,600 to $22,000. Female counter workers with this level of education trailed significantly, increasing from $10,000 in 1959 to $14,000 in 1995.

Prime-age females with high school diplomas and no postsecondary education had a reasonably stable employment history. Approximately one-half held office jobs, while only 12 percent were employed in factories. But employment shares in the two service functions were not stable over these 35 years: 24 percent of females were employed in counter jobs in 1959, 20 percent in 1979, but then 23 percent in 1995. By contrast, employment for females in the hospital/classroom function increased from 11 percent in 1959 to 19 percent in 1969, before declining steadily to 15 percent in 1995.

For females with bachelor's degrees, job opportunities expanded remarkably.

The relative earnings for females with high school diplomas were mostly stable. Once again, office workers were the highest paid in all years increasing from $15,900 to $21,700 in 1989 and then remaining near that level through 1995. Factory workers were second with their earnings increasing from $13,200 in 1959 to $19,300 in 1989, before declining to $18,100 in 1995. Female hospital/classroom workers also followed this growth and decline path: $11,800 in 1959 to $15,700 in 1989, and $15,400 in 1995. Counter workers put in fewer hours and always trailed the rest, but their earnings trajectory was continually upward from $7,900 in 1959 to $12,500 in 1995.

Females who did not complete high school were more evenly distributed among the functional categories. The counter function was the primary source of jobs, with its share dropping from 38 percent in 1959 to 31 percent in 1979 before rising again to 35 percent in 1995. Industrial employment followed next, although the pattern was the opposite. It rose to 33 percent in 1979 from 31 percent in 1959 before contracting to 26 percent in 1995. Office employment was reasonably constant at 20 percent, while the share of hospital/classroom jobs jumped from 10 percent in 1959 to 17 percent in 1969 and then stabilized at this level.

In terms of pay, females with the least education did not experience steady increases. There was some growth through 1979 and then there was stagnation or decline. This was particularly true for factory workers whose earnings increased from $11,800 in 1959 to $15,200 in 1979 before declining to $14,400 in 1995. Earnings of hospital/classroom workers also rose from $9,300 in 1959 to $13,400 in 1989 and dropped to $12,500 in 1995. Low-skilled service workers' earnings rose, but their earnings started from a very low base—from $6,400 in 1959 to $9,500 in 1995. Finally, office workers' earnings started at $14,000 in 1959, edged up to $15,600 in 1979, and remained at that level thereafter. Consequently, office workers started off as the highest-paid group and dropped to slightly below factory workers in the 1970s and 1980s. But when the factory workers' earnings declined in the 1990s, office workers once again became the highest-paid group.

African American and White Workers

Needless to say, White workers comprise the bulk of the workforce and their share of various job categories is similar to the shares for all races. The focus in this section is on the difference between African American workers and White workers.

In 1959, the earnings gap was huge because 81 percent of Black prime-age males and 76 percent of Black prime-age females had *not* finished high school—both numbers 27 percentage points higher than for their White counterparts. Further, White males earned considerably more than Black males with the same education (about 67 percent). In total, White males earned 90 percent more than Black males ($29,200 to $15,400).

Job opportunities in the various categories also reflected these differences. Black males were far less likely to be in the office (31 percent of White males compared to 14 percent of Black males). This was offset by the two production sectors, where Black males were more numerous. Industrial production accounted for 51 percent of Black males and 44 percent of White males, but White males earned considerably more ($27,100 to $16,500). Another large difference was in extractive production, which reflected the larger presence of Black males in farming. In 1959, it accounted for 10.5 percent of Black males and 5.4 percent of White males.

Among females, Black females earned $7,400 on average versus $12,900 (75 percent higher) for White females. The near absence of Black females in the office was startling. While 35.3 percent of White females had jobs in this sector, only 9.5 percent of Black females did. Fully 56 percent of Black females (versus 24.4 percent of White females) were employed in low-skilled services—primarily as domestic servants averaging just $4,800 a year. This contrasts with a figure of $7,800 for White females in low-skilled services employment. In the other functional areas, Black females' annual pay was only about 20 percent below that of their White female counterparts. Consequently, among females of different races in 1959, most of the earnings gap was driven by a different employment distribution rather than being paid less in the same functional area.

By 1979, the educational gap closed but still remained large among prime-age workers: 43 percent of Black males and 36 percent of Black females still had not received high school diplomas, while the figures for White males and females were 20 and 17 percent, respectively. With postsecondary education, the numbers for White males and White females had risen to 44 and 34 percent, respectively, compared to 23 and 26 percent for Black males and Black females, respectively. The narrowing of the educational differences led to a closing of the earnings gap, as White males averaged 45 percent more than Black males, while White females earned only 3 percent more than Black females.

For Black and White males with the same education, the earnings gap shrank to 35 percent, but large differences remained in the categories in which they worked. Once again, far more White males (18 percentage points) were in office employment, while more Black males were in industrial production (13 percentage points). In 1959, Black males were far more likely than White males to be employed in extractive production, primarily farming (10.5 to 5.4 percent). However, by 1995, as other job opportunities for Black males opened up, they were replaced in the farm sector with immigrant labor. By 1995, the share of employment in extractive production declined significantly for all workers, especially for Black males who now were less likely than White males to be in extractive production (1.9 percent of Black males and 2.5 percent of White males).

The relative standing of Black females was transformed once they were no longer limited to low-skilled services. Because Black females became a more important source of their families' income, they worked more hours than White females (1,640 to 1,570 hours in 1979). Thus,

once adjusted for educational attainment, their hourly pay was not much different. As a result, among females of the same educational attainment, Black females took home more pay than White females, with the exception of those who dropped out of high school. Their presence in office employment increased substantially (to 27 percent of workers) and now trailed White females by 17 percentage points. Black females were more likely to be in low-skilled services jobs, but the difference now had shrunk to 5 percentage points (from 23 to 18 percent). In 1995, the largest source of employment for Black females was the hospital/classroom sector where one-third of them worked (compared to one-fourth of White females).

By 1995, the educational gap had closed dramatically. Among White males, only 8 percent had not finished high school, and 60 percent had some postsecondary education. The comparable figures for Black males were 17 and 43 percent, respectively. For their part, 59 percent of White females had attended at least some college, and only 6 percent had not completed high school. By comparison, over half of Black females (52 percent) had some postsecondary education, while only 13 percent had not completed high school.

By 1995, the racial educational gap had closed dramatically.

However, despite a narrowing educational gap, the racial earnings gap of males remained at its 1979 level of 55 percent, which means that the earnings gap among workers with the same level of education increased from its 1979 levels. For those with bachelor's degrees, White males earned 22 percent more in 1979, with the premium growing to 34 percent in 1995. For males with just high school diplomas, the White male advantage grew from 35 percent in 1979 to 47 percent in 1995.

For females, there also was a reversal in earnings status. Although Black females continued to put in more hours (1,860 to 1,777 hours in 1995), they now earned 14 percent less than their White female counterparts. In 1979, Black females had average higher earnings when compared to White females with the same levels of education.[30] By 1995, however, White females had almost a 10 percent advantage.

With respect to the functions and education in 1995 of prime-age males, Black males were 13 percentage points less likely than White males to be employed in office functions. This discrepancy was offset by greater Black employment concentrations in industrial production (7 percentage points), low-skilled services (4 percentage points), and high-skilled services (3 percentage points).

Black males with bachelor's degrees experienced the same large expansion of their job opportunities as did White females. In 1959, one-half of the small number of Black males with these degrees were in education and health care, with only one-quarter in office employment. By 1995, these percentages had switched, with office work being the primary source of employment. Nonetheless, White male college graduates were still 10 percentage points more likely to be employed in office functions than Black college graduates.

Among males with some college, the distribution of Black males in employment functions was not very different from White males in 1995. Black males were slightly more likely to be employed in the hospital/classroom area, but office employment was the predominant source of jobs for both Black males and White males (42 and 44 percent, respectively). The only difference was that this represented a significant decline from 1959 for White males with some college, when 55 percent of them were employed in this area.

For prime-age male high school graduates, factory work became more important for both White and Black males (reaching 45 and 49 percent shares in

[30] It should be noted that White females had much higher levels of education. Therefore, the Black female advantage within educational levels did not translate into an advantage for all females.

1995). Similarly, for both Black and White males, the prevalence of office employment declined, with White males holding a 10-percentage-point advantage throughout the time period. Once again, Black males were more likely than White males to hold jobs in the high-skilled services sector.

Finally, the employment patterns of Black male high school dropouts were not very different from comparable White males. About one-half of Black males and White males were employed in industrial jobs, and 1-in-5 were in low-skilled services. For both Black males and White males, slightly fewer than 1-in-5 were office workers.

Black males and females with bachelor's degrees experienced the same large expansion of their job opportunities as did White females.

Among prime-age females who stayed in school past high school, the functional distribution of employment by educational attainment was very similar for White and Black females. For those with bachelor's degrees, both White and Black females were segregated into the hospital/classroom category even in 1969, before expanding into office employment. By 1995, 90 percent of these most-educated females were employed in one of these two areas, with close to an even split between the two.

Among those with some college, the move from employment in the hospital/classroom to the office was less pronounced. In 1959, almost half of the White females at this educational level were employed in office activities (most were clericals). By 1995, more job opportunities in business managerial and professional roles opened, and the office share rose to 57 percent. Consequently, the decline in the share of skilled service employment was more modest, from 35 percent in 1959 to 25 percent in 1995. Black females with some college did not have the same access to office jobs in 1959 (only a 34 percent share). As this barrier decreased, they moved into clerical as well as professional positions, with the office share reaching 53 percent in 1995. Offsetting this increase was their decline in employment in low-skilled services.

Among females with only high school diplomas, Black females continued to be less likely than White females to be employed in office functions. In 1995, 53 percent of White females and 32 percent of Black females held these jobs. For White females, the functional employment shares were almost identical from 1959 through 1995. Black high school graduates, however, were very concentrated in low-skilled services in 1959 (45 percent) before more job opportunities opened for them. By 1995, only 22 percent were employed in this sector (the same figure as for White females); but Black females were 10 percentage points more likely to be employed in industrial production and high-skilled services industries than their White female counterparts.

Among female high school dropouts, there was little difference in the jobs held between Black and White females. Black females were more likely to be employed in hospital/classroom jobs (as orderlies and teachers' assistants). While the White female distribution remained constant from 1959, it was not constant for Black females. In 1959, Black females were overwhelmingly concentrated in low-skilled services (64 percent). Consequently, even though they were a low-paid group in 1995, even high school dropouts had their job opportunities expanded.

Part II: Understanding Occupational Differences

Creating a Three-Way Occupational Ladder

Labor markets tend to be organized around occupations as much as they are around industries. Each set of skills and type of training open a limited number of opportunities (other than those requiring the least skills). Job ladders are distinct, with each having some sort of supervisory position at the higher levels.[31] In fact, after several years in the labor market, it is hard to compete for jobs outside one's acquired specialty.

The government's official occupational categories presented in Table 1 (on page 5) seem self-evident but are less so when looked at more closely. For example, many would define accountants, musicians, airline pilots, and stock brokers as professionals because of their pay and educational requirements. However, only musicians are officially classified as professionals while the others are put into different categories: Accountants are part of management-related occupations, airline pilots are considered technicians, and stock brokers are in the sales worker category.

These distinctions matter if a set of categories is to be created that satisfies a commonsense view about the quality of different jobs. While the government's categories appear to represent a hierarchical listing of good and bad jobs, occupations with high and low skills and high and low pay have been lumped into the same groups. Thus, this study combines them in simpler and more similar groups.

In particular, there are four major incongruities in the official code where occupations with very different pay and educational requirements are combined:

1) Manager category: Managers at fast-food restaurants and retail establishments function more like supervisors than corporate vice-presidents; in this study, they are listed with nonprofessional supervisors.

2) Sales category: Stock and real estate brokers are combined with salesclerks in the government code, although brokers earn much more, work far longer hours, and require college degrees. To correct this discrepancy, sales representatives, agents, and brokers are included with business professionals.

3) Service category: Police and firefighters are municipal employees who pride themselves on their professionalism; yet the official code places them in this category, along with janitors, fast-food workers, and health aides. As they fit more in the craft model of organization and skill, they are grouped in this category with skilled blue-collar, crafts, machine, and repair workers.

4) Technicians category: This group of occupations is often included with professionals and managers and specialty workers. These medical and science laboratory workers, operators of numerical control equipment, and paralegals have a considerable amount of skill but not as much as other professionals nor do they have the same autonomy, pay, and education. As they more closely resemble other moderately paid workers—such as crafts and repair workers, police, and firefighters—this study includes them in this category.

[31] While American workers do have more chances than workers in any other country to switch jobs and start over, much of a worker's career is determined in his or her first 10 years after leaving school. Rose, for example, found that 68 percent of prime-age males remained in the same broad occupational category for at least 8-out-of-10 years in the 1980s ("Declining Job Stability and the Professionalization of Opportunity").

Definition of the Eight-Way Occupational Divisions

1. Managers, medical doctors, and lawyers
At the top of the earnings hierarchy in America today are medical doctors, lawyers, and executives of business enterprises. Medical doctors and lawyers are unusual professionals in that they have great autonomy and are highly paid. Many lawyers are actually similar to executives in that their actions affect major enterprise decisions. Finally, it should be noted that this combined category is dominated by the managerial component (with 10 million workers) as compared to just under 700,000 each of medical doctors and lawyers.

2. Business professionals
This group is comprised of accountants, architects, science-related professionals who are not in educational institutions (engineers, chemists, computer system analysts), airline pilots, sales representatives, stock brokers, insurance agents, and real estate brokers. These workers are employed by private businesses and require a high level of education, training, and skill.

3. Medical and educational professionals and specialists in arts and letters
These workers require the highest levels of educational certification, and they work predominantly for government and nonprofit enterprises. As opposed to the first two categories of managers and professionals that are predominantly male fields, there are more females than males in this category. A number of professionals who work for nonprofit organizations and government (social workers, social scientists, librarians, urban planners, and clergy) are included here. Artists, musicians, actors, and authors are classified as professionals in the government code and fit better in this category than in one of the first two categories.

4. Supervisors
The fourth category includes line supervisors in white- and blue-collar settings. These workers are often promoted from within and fill in by performing operational tasks when business is brisk. Job titles in this area include blue-collar supervisors and foremen, managers in retail sales and nonprofessional services (recreation, repair, personal service), and farm owners and managers. While the workers in this group clearly have much lower average earnings than any of the first three groups, their pay is higher than any of the other employment classifications.

5. Skilled manual workers
This category is comprised of crafts and repair workers, health and science technicians, police, and firefighters. Their average earnings tend to be similar, although they are classified in the government's occupational code in three separate areas. Technicians require more education than crafts workers, which has led to their being classified with other professional workers; however, their pay and work conditions do not resemble that of the professionals. By contrast, crafts workers, police, and firefighters have been almost exclusively male dominated. They are the source of reasonably good-paying jobs for those without higher education. Still, as community college enrollment has expanded, all three subgroups are comprised of workers with similar educational attainment levels.

6. Clerical and administrative support
This group consists of administrative and clerical workers. In the 19th century, they were highly skilled because of the limited prevalence of reading, writing, and quantitative skills. However, today they have lower status and relative pay. In this study, they were assigned to a separate category because the jobs

are important to female employment patterns. With few exceptions, the ability to advance to elite jobs and remain in the same occupation is very limited. Although many have some postsecondary education (the same as with workers in the previous two categories), very few earn more than $50,000 a year.

7. Operatives
This category consists of a wide variety of less-skilled blue-collar jobs. These factory workers have the lowest level of education, but some have benefitted from unionization and are able to earn over $50,000 a year (8.5 percent of prime-age males).

8. Salesclerks, service workers, and laborers
This final group is comprised of salesclerks, service workers, and farm and industrial laborers. They mostly perform routine tasks under the supervision of others. Fully 80 percent have annual earnings below $20,000, with 45 percent of this group working part-time schedules. Having less skills and a lack of hours lead them to average earnings significantly below that of any other group.

Once the jobs that pay similar amounts were grouped together, the differences among the major categories became more marked.[32] For example, in the government's categories, male managers in 1995 averaged $57,000 a year, while sales workers averaged $37,000. In the new classifications, however, the earnings gap widens to $64,400 and $16,400, respectively. The difference of 54 percent turned into a chasm of almost 300 percent once low-paid managers were included with line supervisors, and highly paid brokers and sales representatives were put with business professionals (see Table 2 on the following page for a description of eight new occupational divisions, and see Table A-1 on page 55, in the Appendix, for the 21 subdivisions).

In order to simplify the presentation of a mountain of numbers, the eight-way occupational division is combined into three major jobs—elite, good, and less-skilled.[33] The top tier (elite jobs) holds the managers and professionals (the first three categories); the middle tier (good jobs) contains supervisors in industrial and nonindustrial settings, technicians, crafts workers, police, firefighters, and clerical and administrative workers (the next three categories); and the bottom tier (less-skilled jobs), which requires the least education and training and is the lowest paid, consists of factory operators, salesclerks, janitors, food-service workers, and farm and industrial laborers (the last two categories). Within each group, working conditions and pay vary, but they have been grouped in this manner because the similarities outweigh the differences.

In going from eight to three occupational groups, two groups that are primarily staffed by females were difficult to assign because they had relatively high educational attainment but low pay. First, health and educational professionals had the highest concentration of those with a bachelor's degree (71 percent), but their earnings were below that of supervisors, police, and firefighters, a subcategory of skilled manual workers (with fewer than 25 percent finishing college). Second, the earnings of clerical workers are comparable with the earnings distribution of operatives (57 percent had annual earnings below $20,000 and only 3.2 percent made more than $50,000), even though

[32] It should be noted that these occupational definitions were used in creating the functional categories detailed earlier.

[33] This division is based on the education and earnings of each occupational code. An index is created for males and females separately in which the relative earnings are weighted three times as heavily as educational attainment. Education is included because some people, such as teachers, may choose their employment on the basis of factors other than earnings—e.g., job satisfaction and intellectual challenge. Education is used as a proxy for the positive elements of an occupation besides pay. See Jencks et al. (1988) for further discussion.

the modern office worker has a lot of skill, including proficiency with computers.

In each case, the female-dominated occupations earned less than the male-dominated occupations with lower levels of education. In this study, the female-dominated occupations were classified with the higher tier (health and educational professionals in the top tier and clerical workers in the middle tier), based on their educational attainment, rather than the lower tier, based on their earnings.[34]

The earnings comparisons come out differently if males and females are viewed separately rather than combined. The earnings of health and educational professionals and clerical workers are in their appropriate tiers. Since most of the ensuing data will be presented for males and females separately, the ranking based on within-gender comparisons is more important than the one based on combined-gender information. Because males earn so much more than females, the combined-gender average is thrown off in occupations that are heavily weighted to either males or females.

Using this approach, the earnings difference in 1995 between each occupational tier was almost a whole order of magnitude. For all experienced workers, less-skilled blue-collar workers, sales-clerks, and service workers averaged $14,700; supervisors, clerical, and skilled manual workers earned $25,300 on average; and those in the elite category earned $42,200.

In the public debate, the issue is often phrased as good jobs or bad jobs. But, the pay divide between managers and professionals and the rest of the workforce is large, and they deserve to be assigned to a separate category, our elite jobs. Somewhat surprisingly, few have focused on highly paid white-collar workers as a group that is distinct from the intermediate group of supervisors and skilled workers. Although they hold the most prized positions, researchers seem to have assumed their numbers are too small and

Table 2

Earnings and Employment of the New Occupational Categories

(Experienced Labor Force in 1995)

	Shares of Workers			
	Share of Employment	Average Earnings*	Percent With B.A.	Percent $50,000-plus
All Experienced Workers	100.0	$26,300	25.0	12.1
Executives, Medical Doctors, and Lawyers	9.0	$55,000	55.8	42.2
Business-Related Professionals	9.5	$42,600	57.2	31.4
Health and Education Professionals	10.0	$30,200	70.9	14.2
Supervisors	8.4	$31,200	22.5	15.9
Skilled Manual Workers	12.5	$28,500	12.3	10.7
Clerical	14.9	$19,300	14.0	2.6
Operatives	11.5	$20,800	4.0	4.6
Sales, Service, and Laborers	24.3	$11,900	6.2	1.3

*Earnings are rounded to the nearest $100 and presented in 1996 dollars.

[34] It should be emphasized that personal career decisions are not made solely on monetary considerations. Many university professors, for example, value the time and opportunity to pursue their own research and intellectual agendas. While they earn less than those with professional degrees, there are offsetting benefits that make these positions coveted and respected.

entry requirements too high to be accessible to a large portion of the population. But neither of these premises is true. As will be documented, the employment share of managers and professionals is large. And, as over half of each age cohort obtains some post-high school education, these jobs are accessible to increasingly more workers—most do not require graduate study or specialized college preparation.

This approach shares many similarities with another three-way division (independent primary, subordinate primary, and secondary markets) discussed under the broad umbrella of "dual labor market theory" (DLM). The origin of this theory began with the observation that blue-collar unionized (primarily male) workers earned more than other less-skilled workers. Since many of these workers were employed by large firms (which many researchers were studying for their monopoly behavior), it seemed reasonable to postulate that monopoly rents in the product market were shared with the workers of the firm in order to maintain labor peace and permit long-run planning. In other words, the monopoly and competitive sectors led to differential pay for blue-collar workers. Doeringer and Piore (1971) added that large firms could support "internal labor markets" that fostered long tenure, the buildup of firm-specific knowledge, and promotions to supervisory positions.

The pay divide between managers and professionals and the rest of the workforce is large.

The strong connection of the characteristics of the firm with employee compensation underplayed the importance of wages as returns to skills—in particular, the high earnings of college-educated managers and professionals across industries. DLM theorists responded to this critique by establishing a third sector—the independent primary—comprised of managers and professionals. But many critics did not see the advantages of this approach[35] and studied the effect of unionization within the context of offsetting higher productivity and eventually under the rubric of "efficiency wages"—a situation where workers respond to higher wages by working harder.

Gittleman and Howell (1995) tried to resurrect the DLM theory with an elaborate factor analysis of different occupations. They argued that three divisions did emerge from the data and that within each of the major segments there were two subdivisions for a total of six *contours*.[36] In their approach, 65 percent of employment fell into the two primary sectors; only one-half of blue-collar employment in the subordinate primary segment was in manufacturing.

These divisions are similar to the three-way division presented in this study, which is not surprising, since pay and education are important defining characteristics in both approaches.[37] Whereas the functional approach allocated all workers in an occupation to a specific tier, Gittleman and Howell evaluated each occupation-industry combination separately and sometimes allocated workers in the same occupation, but different industries, into separate contours. They pursued this strategy because they wanted to show the difference that industry made for a few highly paid, relatively low-skilled blue-collar workers.[38]

But the number of occupations where industrial employment changed the allocation of workers among the three tiers was relatively small. In this

[35] See for example, Glen Cain, "The Challenge of Segmented Labor Market Theory to Orthodox Theory," and William Dickens and Devin Lang, "A Test of Dual Labor Market Theory."

[36] The independent primary is split between private- and public-sector employment; the subordinate primary has routine white-collar (clerical) and higher-paid blue-collar components; and the dependent sector has low-wage blue-collar and "contingent" service/sales partitions.

[37] The reallocations made in this study to the government's occupational code—fast-food managers, police and firefighters, sales representatives—were validated in this factor analysis. Further, they found that most clerical workers scored high enough to be included in the middle tier and that educational and health professionals ended up in the top tier.

[38] Their detailed industry by occupation allocation listing is available from the authors and does not appear in the journal text.

approach, the empirical rigor of factor analysis is lost in order to keep more occupational categories consistent. These categories can, in turn, be more easily correlated with functional changes in the economy and, thus, offer a clearer understanding of economic change. For example, Gittleman and Howell argue that the independent primary sector grows over time, and they define this as occupational upgrading.[39] However, in our study, these developments are discussed within the context of functional changes that lead to the growth of managerial and professional office employment.

Data Results: Earnings and Occupational Distributions in 1995

In 1995, the employment division among the three categories was close to equal, with the smallest share being the 28 percent of the labor force in managerial and professional jobs. As Table 3 shows, the occupational distributions of males and females were very similar but did vary on the basis of age. Among prime-age workers (30 to 59), the distributions also were close to equal, but now the smallest share is the less-skilled occupations with under 30 percent.

Table 3
Employment Shares of Male and Female Workers by Age
(Experienced Labor Force in 1995)

	Shares of Workers		
	Elite Jobs	Good Jobs	Less-Skilled Jobs
All Males	27.8	35.1	37.1
All Females	29.1	36.5	34.3
Males, 30-59	33.0	37.1	29.8
Males, Under 21 & Over 62	13.1	25.1	61.8
Females, 30-59	33.9	37.7	28.4
Females, Under 21 & Over 62	11.5	29.7	58.9

By contrast, the occupational distribution of young and old workers (21 and under and 62 and over) was very different. These workers have less connection to the labor force and were concentrated in the bottom occupational tier (60 percent). Further, very few were employed in the professional and managerial ranks (12 percent versus a prime-age level of 33 percent). These transitional workers (the young are not fully in the workforce, and the elderly are on their way out of it) accounted for almost one-sixth of the experienced labor force. But, because they were concentrated in the lowest employment categories, the occupational distribution for the entire labor force shifted to less-skilled jobs. Thus, to focus on the experience of workers in the middle of their careers, the remaining data results will apply to prime-age workers only.

Table 4 (following page) presents data on prime-age workers by gender and race. While fewer than 25 percent of White prime-age workers were employed in less-skilled jobs, the category included 42 percent of Black females and slightly more than half of Black males and Hispanic males and females. At the other end of the occupational hierarchy, 37 percent of White prime-age workers were employed in professional and managerial positions as compared to about 18 percent of Black and Hispanic prime-age workers (ranging from 14.5 percent of Hispanic males to 23.4 percent of Black females).

Table 5 (following page) reveals the importance of education in determining access to elite jobs. Of those with bachelor's degrees or more, nearly 75 percent of both genders were managers and professionals. Of those with some college, the figure dropped to below 30 percent, and fell even farther to only 10 percent for those with no postsecondary education. Because fewer than 30 percent had bachelor's degrees, the share of managers and professionals with bachelor's degrees was 65 percent for males and 58 percent for females. Thus, while a bachelor's degree was not a requirement

[39] Methodologically, they recognize they cannot make these historical comparisons without assuming that the contours defined in 1979 remained constant over the entire period of their analysis (1973-90).

for professional or managerial positions, it increased the chances greatly.

Of those with bachelor's degrees who were neither managers nor professionals, most were in good jobs and only 6 percent were in the less-skilled jobs. Almost half of those with some college held good jobs, while the remaining split almost equally between elite and less-skilled jobs. Almost half of high school graduates were also in good jobs and half were in less-skilled slots. The job opportunities of the relatively small number who failed to complete high school were limited mainly to less-skilled jobs.

Finally, it should be noted that there is a close connection between the three-tiered occupational approach and the functional analysis presented above.[40] As Table 6 (following page) shows, the majority of elite jobs were based in the office sector—73 percent for males and 53 percent for females. Further, a majority of good jobs also were office-based—38 percent for males and 71 percent

Table 4
Racial Distribution Among Occupational Categories
(Experienced Prime-Age Workers in 1995)

	Shares of Workers		
	Elite Jobs	Good Jobs	Less-Skilled Jobs
Males			
White	37.0	38.3	24.7
Black	16.5	33.0	50.4
Hispanic	14.5	31.7	53.8
Females			
White	37.2	39.2	23.6
Black	23.4	34.7	42.0
Hispanic	18.7	30.5	50.9

Table 5
Educational Distribution Among Occupational Categories
(Experienced Prime-Age Workers in 1995)

		Shares of Workers		
	Education Share	Elite Jobs	Good Jobs	Less-Skilled Jobs
Males				
B.A.+	29.7	72.8	20.7	6.5
Some College	26.1	27.2	47.8	25.1
High School Graduate	32.1	11.6	45.4	43.0
High School Dropout	12.1	4.5	32.7	62.8
Females				
B.A.+	27.0	73.3	20.6	6.1
Some College	29.2	30.3	49.6	20.1
High School Graduate	34.7	14.0	46.1	40.0
High School Dropout	9.1	4.4	18.8	76.9
Shares of Occupational Category with a B.A. or More				
Males		65.6	16.6	6.5
Females		58.4	14.8	5.8

[40] There is an extensive literature on the pay differences of similarly titled positions in different industries. For example, operatives and even managers in manufacturing make considerably more than their counterparts in other sectors. This demonstrates that the nature of a firm has an independent effect separate from the functional division presented here.

for females. By contrast, almost three-quarters of the less-skilled jobs were located in industrial production and low-skilled services.

The connection between the occupational tiers and functions has become stronger over time. Of the 13.7 million new managerial and professional jobs created between 1979 and 1995, 72 percent were in the office sector and 23 percent were in skilled services. Among the 8.4 million good jobs created during these years, 54 percent were office workers, 19 percent were in high-skilled services, and 21 percent were in low-skilled services. Only 7 percent of these jobs were in the goods-producing sectors—the farms and factories.

Race interacts with education to produce differing occupational distributions (see Table 7). For their part, White prime-age workers completed more years of school—more than 30 percent had at least a bachelor's degree and less than 30 percent had some college. Among Black prime-age workers, females had slightly more education than males: 20 percent of females and 16 percent of

Table 7
Educational Attainment by Race
(Experienced Prime-Age Workers in 1995)

	White	Black	Hispanic
Males			
B.A.+	32.6	15.6	11.6
Some College	27.2	27.3	18.4
High School Graduate	32.3	40.1	25.4
High School Dropout	7.9	17.0	44.6
Females			
B.A.+	29.2	19.8	11.5
Some College	29.4	32.1	24.4
High School Graduate	35.6	35.4	29.5
High School Dropout	5.8	12.7	34.6

Table 6
The Quality of Employment by Functional Categories
(Prime-Age Workers in 1995)

	Employment in millions				Percent of total		
	Elite	Good	Less-Skilled	Total	Elite	Good	Less-Skilled
Males							
Extractive Production	0.1	0.5	0.7	1.2	0.4	3.0	5.1
Industrial Production	1.1	5.5	6.7	13.3	7.9	34.3	52.5
Low-Skilled Services	0.3	2.3	3.2	5.8	1.9	14.7	25.4
High-Skilled Services	2.4	1.7	1.0	5.0	16.8	10.4	7.5
Office	10.3	6.0	1.2	17.6	73.1	37.6	9.5
Total	14.2	15.9	12.8	42.9	100	100	100
Females							
Extractive Production	0	0.1	0.2	0.3	0	0.7	1.5
Industrial Production	0.3	0.7	2.6	3.6	2.1	4.6	23.3
Low-Skilled Services	0.4	1.2	5.2	6.7	3.1	7.9	46.8
High-Skilled Services	5.5	2.3	2.4	10.1	41.5	15.4	21.8
Office	7.0	10.5	0.7	18.2	53.2	71.4	6.7
Total	13.2	14.7	11.0	38.9	100	100	100

males had bachelor's degrees, while 48 and 57 percent, respectively, had no postsecondary education. The share of Hispanics with bachelor's degrees was 12.8 percent for both males and females. Again, more females than males had some postsecondary education, which left 70 percent of Hispanic males and 64 percent of females with, at most, a high school diploma.

Black and Hispanic prime-age workers were distributed among the three occupational categories differently than White prime-age workers who had similar schooling. Rather than present a long table with 24 rows (two genders, four educational levels, and three races), a few points demonstrate the magnitude of the effect. About 75 percent of White males and females with bachelor's degrees were in elite jobs, as opposed to just under 61 percent of Black prime-age workers, 68 percent of Hispanic males, and 65 percent of Hispanic females. Conversely, only 5 percent of White prime-age workers with bachelor's degrees, but 10 percent of Black prime-age workers and 13 percent of Hispanic prime-age workers had less-skilled jobs. Thus, Black and Hispanic college graduates could get the elite jobs, although not to the extent of White college graduates.

Among prime-age male workers with no postsecondary education, 41 percent of White males and 65 percent of Black and Hispanic males were employed in less-skilled jobs. At this educational level, the shares in managerial and professional ranks were 12 percent for White males and 6 percent for Black and Hispanic males. The difference in the good jobs category for those without postsecondary education also was great: 48 percent for White males and 28 percent for Black and Hispanic males.[41]

The next step is to look at earnings, which vary greatly by occupational and demographic group within occupations.[42] First, prime-age workers earn much more than those at other ages. For males the earnings gap was 100 percent, while prime-age females earned 73 percent more. But, as was shown in Table 3, prime-age workers were more likely to be in higher-paying fields. While this explains part of the earnings gap, there remains a significant difference for those in the same occupation and with the same level of education (about 65 percent for males).

Second, the earnings levels of males and females are quite different, thus constituting the "gender gap." While there is evidence that the earnings gap is shrinking, males still are more likely to be employed in the higher-paying positions among elite jobs, to work more hours per year, and to earn more dollars per hour.[43]

As a result, among prime-age workers, males averaged 72 percent more in pay than females in 1995 (see Table 8, following page).[44] In part, this is due to differences in the finer level of occupational detail. For example, while 49 percent of

[41] It appears that the racial gap is larger among those with less education. This is consistent with Wilson's thesis in *The Declining Significance of Race* that discrimination is less pronounced for more-educated Blacks.

[42] Labor compensation can be presented as wages per hour or earnings per year. The second measure is used here because being able to maintain full-time, full-year employment is a positive indicator of job quality. By and large, this study will use average earnings, although the shares of workers in each category that are high paying (greater than $50,000 annually) and low paying (less than $20,000) are also available and will sometimes be used. Since comparisons are being made among many gender-race/ethnicity/educational subcategories, some cells have a small number of cases; thus, average rather than median earnings were used as the representation of normal pay.

[43] Over the past 15 years, different factors have affected the male/female earnings ratio. First, females have increased their educational attainment faster than males. Now, young females are slightly more likely to enter and finish college than males. Second, females have vastly increased their hours worked. In the 1970s, prime-age females only averaged 870 hours per year over 10 years because many females moved in and out of the labor force. In the 1980s, their working time increased by 45 percent to 1,243 hours per year. While females still trailed the labor effort of males (approximately 2,200 hours per year in both decades), Rose (1994) speculated that this increase in labor market experience was responsible for their 10 percent increase in wage rates.

[44] In the mass media, the most widely reported figures on the gender gap compare hourly earnings of full-time, full-year workers. In this study, the annual earnings of all prime-age workers are compared. This means that the gap here is greater than the more widely quoted one.

female managers and professionals were educational and health-care professionals, the figure for males was just over 20 percent. As discussed above, average earnings of the health/educational professionals were much lower than for other managers and professionals. Using the more detailed, 21-level occupational subcategories, the gender gap was close to 60 percent for those employed in the same occupations—the gaps are greatest among managers, medical doctors, lawyers, sales representatives, sales workers, and operators; and are least pronounced among educational and health-care professionals and science-related business professionals.

Combining age and gender, prime-age males earned 100 percent more than non-prime-age males and 100 percent more than females of all ages. Consequently, they represented 33 percent of the workforce but received 51 percent of the earnings. The earnings advantage for prime-age males was particularly large in less-skilled occupations. Since many of the non-prime-age males in the low-skilled services category were not primary earners, they tended to be part-time (35 percent), with most (77 percent) earning less than $20,000 a year. In contrast, few prime-age males in this category were part-timers (7.5 percent), and they were much less likely to bring home under $20,000 (42 percent).[45]

Finally, the average pay of prime-age males with bachelor's degrees in 1995 was $65,000 (see Table 8).[46] This high level was due primarily to over three-quarters of this group being in elite jobs where they earned more than $70,000 on average.[47]

Comparing workers within occupations with different levels of schooling, the premium for bachelor's degrees was about 20 percent over those with some college and 40 percent over those with no postsecondary schooling. But occupation itself was also important. Those without any college but still employed in elite jobs had average earnings of $43,000, while males with a bachelor's degree who did not work in elite jobs averaged $42,000.

Table 8

Average Earnings of Males and Females by Occupational Categories

(Experienced Prime-Age Workers in 1995)

	All	Elite Jobs	Good Jobs	Less-Skilled Jobs
Males, All Educational Levels	$39,800	$58,600	$35,800	$24,000
Females, All Educational Levels	$23,200	$33,700	$21,400	$13,000
Gender Gap*	72%	74%	67%	85%
Males, B.A. +	$58,700	$64,800	$46,300	$29,800
Females, B.A. +	$34,000	$37,700	$26,600	$15,300
Gender Gap*	73%	72%	75%	95%

* The percent males make more than females.

[45] On the other end of the pay scale, 25 percent of all prime-age males but only 8 percent of prime-age males in the less-skilled jobs earned more than $50,000 in 1995. Thus, there were only a few highly paid unionized factory workers who obtained considerable overtime and high annual earnings.

[46] The average earnings of this group is sensitive to how high-earners are treated (the top coding problem). The earnings of this group would have been 10 percent higher if the raw microdata supplied by the Census Bureau were used.

[47] Thus, the 10.8 percent of all workers who were prime-age males in elite jobs received over one-fourth of all monetary compensation (25.4 percent). Given that this group probably had the most generous benefits, their share of total compensation could have been as high as 30 percent.

With respect to the effects of race/ethnicity on pay, for females the differences were small at the three-level occupational division; thus, virtually the entire gap between groups was due to differences in employment categories. Among males, however, White prime-age workers earned more than either Black or Hispanic prime-age workers, even in the same broad occupational groupings. Even when the more detailed occupations were compared by educational level, a 25 percent gap remained (see Table 9).

Table 9

Average Earnings by Race/Ethnicity and Occupation

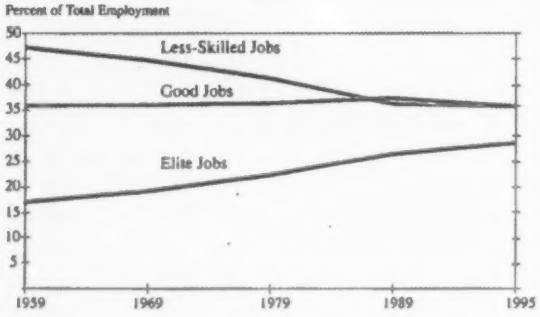
(Experienced Prime-Age Workers in 1995)

	All	Elite Jobs	Good Jobs	Less-Skilled Jobs
Males				
White	$43,000	$59,900	$37,200	$26,500
Black	$27,700	$45,400	$29,100	$21,000
Hispanic	$25,300	$45,100	$28,300	$18,100
Females				
White	$24,000	$33,700	$21,300	$13,000
Black	$21,000	$32,100	$22,200	$13,900
Hispanic	$17,600	$30,600	$19,900	$11,400

Changes over Time—1959 to 1995

From 1959 to 1995, the changes have been gradual but substantial (see Figure 14).[48] At the beginning of the period, almost half the workers (47 percent) were in less-skilled jobs and only 17 percent were in elite ones. By the end, this 30-percentage-point gap had shrunk to 7 percentage points as the share of less-skilled jobs declined to 36 percent, and the share in elite ones increased to 28 percent. Remarkably, the share in the good jobs remained virtually constant over the period, starting and ending at 36 percent of employment.

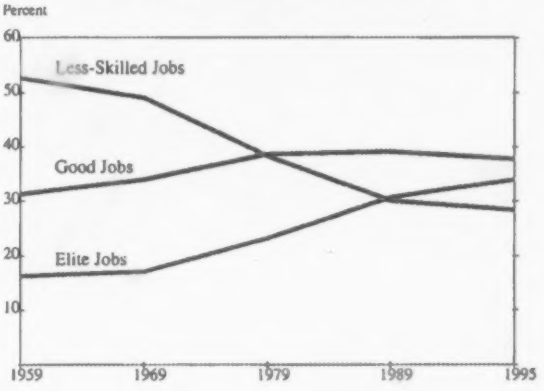
Figure 14
Fewer Workers Have Less-Skilled Jobs Than Ever Before



In other words, the 11-percentage-point gain at the top was offset by an equal decline in the share of less-skilled jobs. This kind of movement is consistent with the educational upgrading of the workforce, but inconsistent with the model of the new economy as comprised primarily of less-skilled jobs.

While the distribution among the three sectors was almost identical for prime-age males and females in 1995, this was not always the case (see Figure 15). In 1959, when females spent more of their prime-age years raising a family, they were much more likely to be employed in the bottom tier of the occupational division (53 percent). In the ensuing years, females shifted continuously out of these jobs into better-paying positions, such that by 1995 only 28 percent were in less-skilled jobs.

Figure 15
The Share of Prime-Age Females in Less-Skilled Jobs Has Declined Dramatically



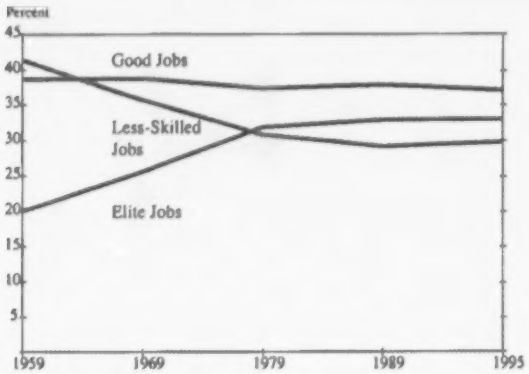
In other words, fully 25 percent of the female labor force upgraded their occupations. The majority were new college-educated workers who moved into elite jobs as the share in this category grew steadily from 16 percent in 1959 to 34 percent in 1995. The share of workers in the good jobs category (mostly clerical and related positions) grew from 31 percent in 1959 to 39 percent in 1979 before edging down to 38 percent in 1995. This remarkable transformation reordered the ranking of the three divisions. In 1959, the share of prime-age females in less-skilled jobs was the largest by a significant amount, 37 percentage points greater than the share in elite jobs. By 1995, the less-skilled jobs shrank to the smallest component, even trailing the share in elite jobs by 6 percentage points.

For males, the occupational upgrading was large but less dramatic than the shift in females' work. Over time, there was an 11-percentage-point

[48] The official codes have been changed numerous times over this time span, but the Bureau of the Census (1989) documents the consistency between the new codes. With a few minor exceptions, it is not hard to align occupations over this time period. We chose, however, not to use the 1950 Census because of our lack of confidence in maintaining consistency.

decline in the share of less-skilled jobs (see Figure 16), from 41 percent in 1959 to 30 percent in 1995.

Figure 16
Fewer Prime-Age Males Are in Less-Skilled Jobs



Offsetting this decline was a slightly larger increase of 13 percentage points in the share of elite jobs, from 20 percent in 1959 to 33 percent in 1995. The share in good jobs was almost constant, falling slightly from 39 to 37 percent.

Again, the order of ranking changed. The share in less-skilled jobs was the largest in 1959—21 percentage points more than the elite jobs; but by 1995, the less-skilled jobs slipped to third, registering 3 percentage points less than the share of the elite jobs. Examined more closely, however, this move was basically completed by 1979, with the shares in each of the three occupational groups remaining virtually constant in the years that followed.

Another difference is the relevance of age in determining employment outcomes. For females, the distribution of employment between prime-age and young/old workers was not nearly as stark in 1959 as it was in 1995 (see Table 10), when there were fewer young/old in elite jobs than those in their prime-age span. This difference was offset by a higher ratio in good jobs, while the share in less-skilled jobs was basically the same for females of all ages.

Table 10
Employment Shares of Male and Female Workers by Age
(Experienced Labor Force in 1959)

	Shares of Workers		
	Elite Jobs	Good Jobs	Less-Skilled Jobs
All Workers	16.9	36.0	47.1
Males, 30-59	20.0	38.6	41.3
Males, Under 21 & Over 62	10.9	30.6	58.5
Females, 30-59	16.1	31.2	52.6
Females, Under 21 & Over 62	8.7	40.4	50.9

For males, the difference between prime-age and young/old workers also grew over time. In 1995, the share of prime-age males in less-skilled jobs was 32 percentage points less than it was for young/old males; in 1959, this difference was only 17 percentage points. Conversely, the share of elite jobs among prime-age males was 20 percentage points greater than that of young/old workers in 1995; in the earlier year, this earnings gap was only 9 percentage points. Basically, in 1959, males tended to start their working lives earlier, and fewer left the labor force in their sixties.

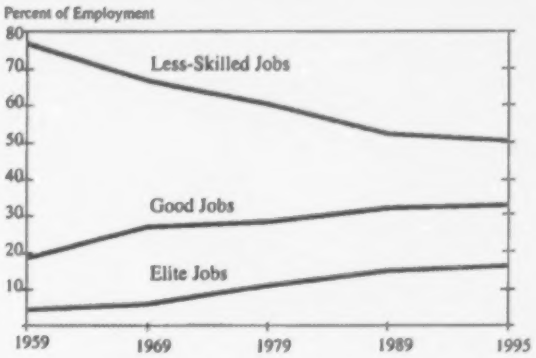
The racial divide was much larger in 1959 when Black workers were almost entirely limited to employment in the less-skilled jobs.[49] The few who made it into the elite jobs were most likely employed in the health and education fields. Even among prime-age workers, only 1.9 percent of Black males and 0.8 percent of Black females were employed in the managerial, law, medical doctor, or business professional categories. A few Black males were employed in skilled manual jobs while fewer Black females were clerical workers. This left 77 percent of Black males and 83

[49] Although no separate data were collected on Hispanics (as they were a much smaller share of the population), their situation was probably very similar to Black prime-age workers at that time, even though most Hispanics would have been classified as White prime-age workers.

percent of Black females as operatives, salesclerks, service workers, and laborers; these figures were a remarkable 35 percentage points higher than their White female counterparts'.

Fortunately, the barriers to Black employment became less severe. As Figure 17 shows, Black males have steadily moved out of the less-skilled jobs. Their employment share in the elite jobs jumped from 4.4 percent in 1959 to 16.5 percent in 1995. While only 2 percent were employed in managerial and business professional jobs (two of the subcategories in the top tier) in 1959, the figure rose to 11 percent in 1995. Further, their presence in good jobs rose from 19 to 33 percent.

Figure 17
The Share of Prime-Age African American Males Who Have Less-Skilled Jobs Has Declined Dramatically

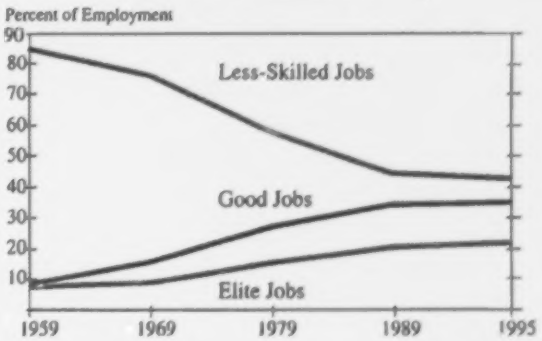


Nonetheless, they had not fully caught up to White prime-age workers by 1995. Approximately 25 percent of White prime-age males, but 50 percent of Black prime-age males, were in less-skilled jobs. Consequently, the 35-percentage-point gap in 1959 shrank by 10 to 25 percentage points. While Black males were concentrated in the less-skilled jobs, White males had a much greater presence than Black males (20 percentage points) in the elite jobs: 37 percent for White males and 17 percent for Black males.

The transformation of job opportunities for Black females was even greater, with their share in the less-skilled jobs declining from 83 percent in 1959 to 42 percent in 1995 (see Figure 18).

As their access to good jobs increased, their share in good jobs jumped from 9 percent in 1959 to 35 percent in 1995. Also, they were much more likely to land elite jobs, with the share of their employment in this category increasing from 8 to 23 percent.

Figure 18
Fewer Prime-Age African American Females Have Less-Skilled Jobs



Interestingly, the earnings gap between Black and White females was much narrower than for males (see Table 11). As noted earlier, Black females historically spent more hours in the paid labor force and had comparable annual earnings. However, White females in 1995 were more likely to be in elite jobs (37 to 24 percent) and less likely to fall into the less-skilled jobs (24 to 42 percent).

As we have noted before, the share of the workforce with some postsecondary education has

Table 11
Racial Distribution Among Occupational Categories

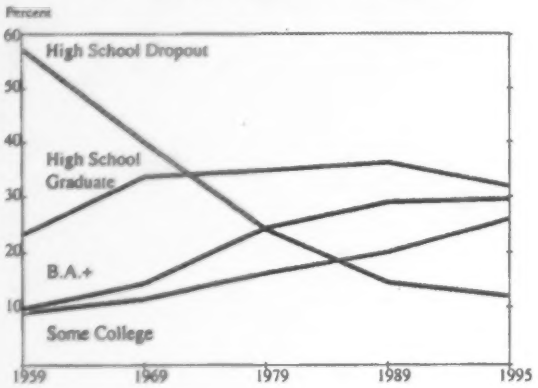
(Experienced Prime-Age Workers in 1959)

	Shares of Workers		
	Elite Jobs	Good Jobs	Less-Skilled Jobs
Males			
White	21.6	40.7	37.7
Black	4.4	18.9	76.7
Females			
White	17.3	34.5	48.2
Black	7.9	8.8	83.3

expanded greatly. In 1959, only 20 percent of prime-age workers went beyond high school, but by 1995, the figure had reached 54 percent (see Figure 19).

As this upgrading occurred, there was a shift from less-skilled jobs to elite jobs. Thus, the question arises as to whether the share of top jobs among college-educated workers increased, or if the increase in education alone explains the shift in employment.

Figure 19
Educational Attainment Has Increased Markedly for Prime-Age Workers



When Table 12 is compared to Table 5 (page 33), the 1959 distribution among the three categories by educational level is not that different from 1995. However, there were some perverse movements. During a period when the overall male share of less-skilled jobs was declining substantially, the share of high school graduates and dropouts in less-skilled positions was rising.

As noted above, the relative position of each educational level changed. Although there were more elite jobs available, they were predominantly filled by those who had acquired bachelor's degrees. Consequently, the share of males with some college in the top tier of occupations fell 15 percentage points (from 43 to 28 percent). Instead of getting the elite jobs, these males were more likely to have good jobs.

Table 12
Educational Distribution Among Occupational Categories
(Experienced Prime-Age Workers in 1959)

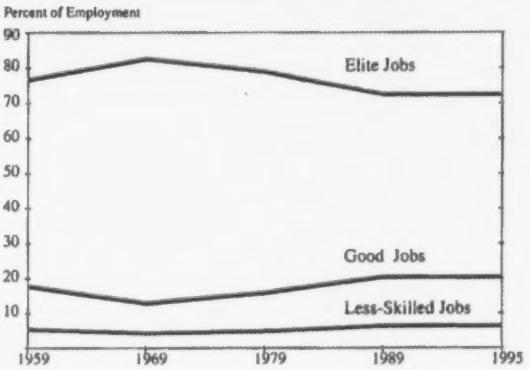
	Shares of Workers			
	Education Share	Elite Jobs	Good Jobs	Less-Skilled Jobs
Males				
B.A.+	10.0	77.0	17.8	5.3
Some College	9.3	42.8	38.7	18.5
High School Graduate	23.3	20.4	48.3	31.3
High School Dropout	57.4	6.2	38.3	55.4
Females				
B.A.+	8.6	82.7	14.0	3.3
Some College	10.3	36.9	44.7	18.4
High School Graduate	13.1	11.1	51.7	37.3
High School Dropout	76.0	3.5	18.9	77.5
Shares of Occupational Category with a B.A. or More				
Males		38.4	4.6	1.3
Females		44.2	3.9	0.5

The same situation applied to male workers with only high school diplomas as they shifted from the top to bottom half of the educational distribution. By 1995, only 12 percent were in elite jobs. Over this period, their employment in less-skilled jobs rose from 31 to 43 percent. These movements were in the opposite direction from the overall upgrading of occupational employment among all males. Similarly, the share of high school dropouts in less-skilled jobs increased from 55 percent in 1959 to 63 percent in 1995.

Even among males with bachelor's degrees, there was some downward movement in the share in the top tier from a high of 84 percent in 1969 to 74 percent in 1995 (see Figure 20). Since the movement for females was similar, it appeared that not as many college graduates were moving into elite jobs as they did before.[50] These jobs were still the most likely positions for the university-educated, but the competition for these slots was intense and slightly fewer were successful in their quest. Offsetting the decline of the share in the elite jobs was an increase in good jobs; very few were forced into the less-skilled jobs.

Figure 20

Approximately Three-Quarters of Prime-Age Males with Bachelor's Degrees Have Elite Jobs

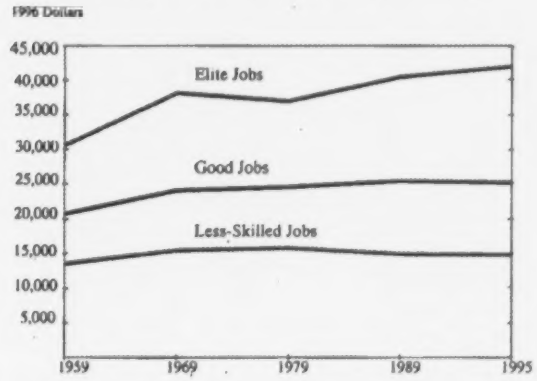


[50] There has been a heated debate over the quality of jobs of new college graduates. See Hecker (1992), Tyler et al. (1995), and Pryor and Schaffer (1997).

Earnings History

For all workers, average remuneration in the elite jobs grew from $30,700 in 1959 to $37,200 in 1979 (see Figure 21).

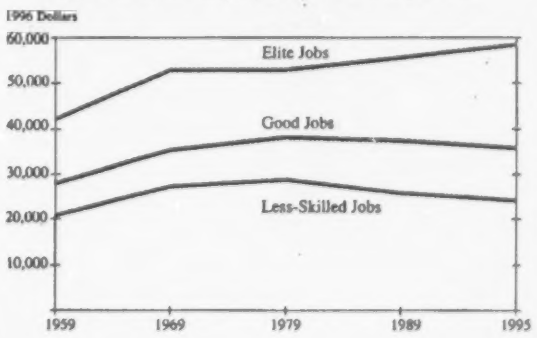
Figure 21
The Earnings Premium for Workers In Elite Jobs Has Grown Considerably



Except for a brief decline with the entry of young, highly educated baby boomers in the 1970s, earnings growth resumed after 1979. However, among good and less-skilled jobs, after experiencing large gains in the 1960s, growth slowed in the 1970s and 1980s and declined in the 1990s. As a result, earnings differences were greatest by 1995. Those in less-skilled jobs earned only 35 percent of the salary of those with elite jobs in 1995, compared to 44 percent in 1959.

For prime-age males, the patterns were even more stark (see Figure 22). While those in the top tier of the occupational division grew steadily (10 percent after 1979), the earnings in the other major categories declined after 1979. For good jobs, this decline was 7 percent, while it was 16 percent for workers in the less-skilled jobs.

Figure 22
The Earnings Inequality Among Males Has Grown Depending on the Type of Job They Have



These movements mirrored the increase in the earnings premium for males with bachelor's degrees. Since they were concentrated in elite jobs, it is not surprising that earnings in the elite jobs became more distinct from the other two. However, not all of the most-educated males

Table 13
Average Earnings of Prime-Age Males by Occupational Attainment

	Elite Jobs	Good Jobs	Less-Skilled Jobs
B.A.+			
1959	$46,508	$43,154	$28,275
1969	$58,613	$48,985	$34,191
1979	$56,645	$46,601	$30,071
1989	$60,969	$48,043	$30,604
1995	$64,905	$46,388	$30,816
Some College			
1959	$43,940	$31,550	$28,208
1969	$52,369	$40,094	$31,203
1979	$49,870	$40,295	$31,203
1989	$48,900	$39,783	$28,813
1995	$49,822	$37,186	$26,565
High School Graduate			
1959	$39,488	$29,934	$25,080
1969	$47,996	$36,633	$31,596
1979	$47,099	$38,927	$32,021
1989	$45,002	$35,942	$27,680
1995	$43,222	$33,608	$25,222
High School Dropout			
1959	$35,379	$25,339	$8,412
1969	$38,352	$31,073	$10,503
1979	$41,324	$31,958	$11,651
1989	$35,271	$26,766	$11,279
1995	$34,713	$24,405	$11,200

became managers and professionals, and those who did not become managers and professionals earned less in 1995 than in 1979 (see Table 13, previous page).

Consequently, the earnings differences of these highly educated males grew over time: in 1959, those in good jobs earned only 7 percent less than their counterparts in the top tier of the occupational division; by 1995, the difference grew to 29 percent. In other words, the earnings gains among college-educated males were limited to those in elite jobs.

At the same time, the earnings of workers with less education who were employed in elite jobs reached their maximum in 1969 and fell 8 percent thereafter. This finding is particularly interesting because it means the higher earnings of managers and professionals were driven completely by those with the most education. Combined with the previous results, it appears the earnings gains of those with bachelor's degrees occurred only among those with top-level jobs, and the increase in earnings of those at this level occurred only for those with such degrees. Thus, earnings inequality among college-educated males and between managers and professionals was based on educational attainment. In 1959, those with some college earned 5 percent less than those with bachelor's degrees, but by 1995, the difference had grown to 24 percent. For those with high school diplomas, the difference went from 15 percent in 1959 to 33 percent in 1995 less than college-educated males.

The earnings gains among college-educated males were limited to those in elite jobs.

A pattern emerges when tracing the earnings of those without bachelor's degrees who were neither managers nor professionals. Earnings rose in the 1960s, registered slight gains or losses in the 1970s, and declined significantly afterwards.

Further, the drops were greatest for those with less education and for those in the less-skilled jobs. In the less-skilled jobs, earnings after 1979 declined 15 percent for males with some college, 22 percent for high school graduates, and 26 percent for dropouts. In good jobs, the figures were 8, 14, and 24 percent, respectively.

To shed more light on the increasing importance of bachelor's degrees, this study explored the more detailed (21) occupational breakdowns and the causes of the 10 percent earnings gain of males with this level of education from 1979 to 1995 (see Table 14, following page).

Over this period, the distribution of employment changed (a mix effect), as did the earnings of each occupation (an earnings effect). For example, in 1980, nearly 1-in-7 males were teachers, while, in 1995, only 1-in-10 had these positions. Because teachers earned 29 percent less than the average salary of males with bachelor's degrees, this shift alone (out of a relatively less-skilled field) was responsible for 15 percent of the overall 10 percent gain in average earnings of all managers and professionals. Other occupational groups that had a lower share of the college-educated included managers (0.7 percentage points) and science-related professionals (1.2 percentage points). Since these jobs paid above average, these changes tended to cause average earnings to decline. The occupations that grew in size included supervisors, technicians, police, and firefighters. These jobs also earned less than the average for all male college graduates so the overall mix effect was very small and slightly negative.

With no mix effect, all the increases in earnings are explained by pay gains within occupations. As Table 14 shows, the gains varied considerably among the major occupations held by males with bachelor's degrees. Considering the importance attached to high-technology skills, it is surprising that the earnings of science-based professionals did not increase or play a role in the rise of the earnings of those with bachelor's degrees. The biggest group was managers, who represented 22.1 percent of employment and whose earnings rose by 15 percent. This gain alone was responsible for 42 percent of the increase. The other main contributors with positive earnings growth were lawyers (10 percent), medical doctors (23 percent),

and sales representatives, including brokers and agents (18 percent). Thus, except for physicians, it was the business managers and professionals who drove the rise in earnings (of the group with this educational level).

Since the earnings trend of science-related professionals was unexpected (given the media stories about the lack of high-technology workers), changes were tracked at even greater occupational detail (the three-digit occupational code) among prime-age males with bachelor's degrees. Between 1979 and 1995, the earnings of computer system analysts inched up 3 percent from $56,300 to $57,900. These workers were much more prevalent in 1995 than in 1979 (growing from 9 to 25 percent of science-related professionals), but this increased share brought the average earnings of the group as a whole down because they made less than the other detailed occupations in this category.

Engineers were the largest occupation among science-related professionals. But their share declined from 75 percent in 1979 to 53 percent in 1995, while their earnings dropped from $63,000 to $62,000. Civil, electrical, and mechanical engineers were the common areas of specialization,

Table 14
Changes in Earnings of Prime-Age Males (B.A.+), 1979-1995

	Share of B.A.+ in 1995	B.A.+ Earnings in 1979	B.A.+ Earnings in 1995	% Change in Earnings from 1979 to 1995
Managers	22.8	$64,444	$74,021	15
Lawyers	2.9	$73,911	$91,581	24
Medical Doctors	3.1	$87,568	$125,111	43
Accountants	6.9	$53,529	$57,600	8
Sales Representatives and Brokers	7.3	$53,851	$66,553	24
Science-Related Professionals	13.3	$60,539	$59,629	-2
Other Health Professionals	1.6	$50,090	$48,313	-4
Teachers	9.7	$40,675	$42,228	4
Arts and Letters	5.7	$38,432	$44,098	15
Sales Supervisors	7.5	$52,729	$54,132	3
Blue-Collar Supervisors	1.7	$50,721	$49,295	-3
Farm Owners and Managers	0.5	$48,678	$47,250	-3
Science Technicians	2.9	$43,100	$45,554	6
Crafts and Repair Workers	2.3	$40,891	$32,711	-20
Police and Firefighters	1.6	$48,947	$48,698	-1
Clericals	3.7	$41,172	$37,380	-9
Operators	2.2	$30,461	$28,634	-6
Sales	1.8	$32,317	$37,495	16
Service Workers	1.5	$25,976	$29,258	13
Laborers	0.8	$34,059	$26,290	-23
Farm Workers	0.1	$19,857	$11,318	-43
All Prime-Age Males with B.A.+	100.0	$53,784	$58,986	10

and all of these detailed occupations experienced at least a 4 percent earnings loss from 1979 to 1995. The only occupation to have strong earnings growth were airline pilots whose earnings rose from $67,000 to $82,000.[51]

The same exercise explains the 18 percent drop in male high school graduates' earnings, for whom there was a massive shift in the occupational distribution. In 1979, 16.3 percent of this group was in elite jobs and 49.4 percent were in good jobs. By contrast, these shares were 11.7 and 45.6 percent, respectively, in 1995. In other words, there was an extra 8.4 percent in less-skilled jobs in 1995 than there would have been if the 1979 employment distribution had held. Since the pay differences among the three tiers was large, even among high school graduates, this shift from elite jobs to less-skilled jobs was responsible for one-quarter of the loss in earnings for this group.

The earnings decline also was due to the altered pay levels within the same job titles (see Table 15). The two most common jobs for high school graduates consistently have been factory operatives and crafts/repair workers (skilled blue-collar jobs),

Table 15

Changes in Earnings of Prime-Age Males (High School Graduates), 1979-1995

	Share of High School Graduates in 1995	High School Graduates' Earnings in 1979	High School Graduates' Earnings in 1995	% Change in Earnings from 1979 to 1995
Managers	6.4	$49,449	$45,731	-8
Accountants	0.8	$44,669	$34,646	-22
Sales Representatives and Brokers	2.4	$45,670	$42,776	-6
Science-Related Professionals	0.9	$50,024	$47,342	-5
Other Health Professionals	0	$28,328	$30,768	9
Teachers	0.3	$40,990	$36,554	-11
Arts and Letters	0.8	$36,027	$31,493	-13
Sales Supervisors	7.1	$36,718	$35,263	-4
Blue-Collar Supervisors	5.4	$45,155	$38,853	-14
Farm Owners and Managers	1.1	$14,735	$19,614	33
Science Technicians	1.4	$42,580	$37,887	-11
Crafts and Repair Workers	22.9	$39,068	$32,075	-18
Police and Firefighters	2.1	$37,329	$40,908	10
Clericals	5.6	$36,559	$31,840	-13
Operators	24.5	$35,422	$28,893	-18
Sales	2.3	$30,398	$23,347	-23
Service Workers	7.8	$22,746	$18,672	-18
Laborers	7.4	$28,255	$21,011	-26
Farm Workers	0.7	$18,478	$21,038	14
All Prime-Age Male High School Graduates	100.0	$37,893	$31,150	-18

[51] This is ironic in that pilots are classified as technicians in the government code but were assigned to science-related professionals in this study.

for which 1995 earnings were 18 percent below their 1979 level. Because these two types of positions account for about one-quarter of the group's employment, their earnings loss is responsible for a similar proportion of the overall earnings loss. Thus, when combined with the shift effect, 75 percent of the earnings change can be explained by just these factors.

Since the earnings of males with some college and high school dropouts also declined, the pay of prime-age males in 1995 was lower than it was in 1979, despite an increase in educational attainment. Paradoxically, science-related professionals were one of the few subgroups of managers and professionals to have lower earnings in 1995 than in 1979. Further, except for some supervisors, the earnings of all of the detailed occupational groups in the good and less-skilled jobs registered earnings losses after 1979. This included a modest 2 percent decline in the pay of technicians, a result that seems to contradict the thesis that those with specialized technological skills were the winners in the new economy.

Among prime-age females, the story is very different. As they became more consistent members of the workforce, their earnings and job opportunities rose. The gains by occupational category since 1959 were 80 percent for elite jobs, almost 50 percent for good jobs, and 60 percent for less-skilled jobs. Needless to say, the gender gap was considerably greater in 1959 in all occupational groups (see Table 16). The change in the relative premium of a bachelor's degree for females was less than it was for males. In 1959, females with bachelor's degrees

Table 16
Average Earnings of Prime-Age Females by Occupational Attainment

	Elite Jobs	Good Jobs	Less-Skilled Jobs
B.A.+			
1959	$21,705	$17,964	$8,842
1969	$27,897	$20,149	$13,331
1979	$28,338	$19,193	$11,365
1989	$35,402	$24,615	$15,050
1995	$37,477	$26,513	$15,319
Some College			
1959	$16,051	$16,027	$10,325
1969	$23,166	$18,643	$10,164
1979	$22,805	$18,588	$12,366
1989	$28,953	$21,402	$14,234
1995	$29,124	$21,625	$13,985
High School Graduate			
1959	$16,506	$15,159	$9,104
1969	$21,418	$17,130	$11,043
1979	$23,066	$17,957	$12,330
1989	$25,059	$20,346	$12,958
1995	$26,652	$19,972	$13,144
High School Dropout			
1959	$14,536	$13,780	$8,412
1969	$15,888	$14,808	$10,503
1979	$15,588	$16,273	$11,651
1989	$20,018	$16,679	$11,279
1995	$18,370	$15,472	$11,200

Table 17
Average Earnings of Males and Females by Occupational Categories
(Experienced Prime-Age Workers in 1959)

	All	Elite Jobs	Good Jobs	Less-Skilled Jobs
Males, All Educational Levels	$27,900	$42,300	$28,100	$21,000
Females, All Educational Levels	$12,200	$18,500	$15,000	$8,600
Gender Gap*	129%	127%	86%	144%
Males, B.A.+	$45,000	$46,400	$42,900	$28,000
Females, B.A.+	$20,800	$21,700	$18,00	$8,800
Gender Gap*	116%	114%	138%	318%

* The percent males make more than females.

earned 90 percent more than those with no post-secondary schooling and 39 percent more than those with some college. In 1995, these premiums increased modestly to 101 and 54 percent, respectively (see Table 17, previous page). In other words, the educational premium for females was slightly higher than it was for males in 1959, but slightly less in 1995.

Conclusion: Education and the Economy

The United States has been committed to expanding educational opportunity for over 150 years, as it was one of the first nations to make public schooling mandatory. At the turn of the 20th century, a movement began to extend this commitment to publicly provided high school training. Finally, after World War II, the G.I. Bill was the impetus that made college attendance more common. This was followed by the National Defense Education Fund, Pell grants, the National Science Foundation, and other efforts to make higher education affordable. At each point, civic leaders argued that the cost was really an investment in America's future and, hence, well worth making.

The American faith in the value of education is reflected in labor market success. Workers with higher educational attainment tend to get better jobs and even earn more in similar jobs held by those with less schooling. But, as noted before, the difference in earnings based on education has risen in the last two decades. Thus, the increase in earnings occurred during the rapid expansion in the number of college graduates, which would seemingly violate the laws of supply and demand. Normally, the relative price of an item (in this case, college-educated workers) declines if its supply increases.[52] Consequently, the higher earnings mean that the demand for college-educated labor must have been increasing at an even greater rate than supply.[53]

Explaining why demand increased so sharply in this manner has been a major project for labor economists over the last decade. In the industrial labor model, the tendency is to look for some change in productivity to explain these movements, and economists have coined the term "skill-biased technological change." Former Labor Secretary Robert Reich reflected this consensus view of the heightened demand for skilled labor and noted that: "Researchers at the Bureau of Labor Statistics tell me that the fastest-growing occupations are technician-type jobs paying above average wages." (Reich, 1997, p. 131).

In fact, the Bureau of Labor Statistics at that time projected that technicians would grow at a rate only slightly faster than the average of all occupational growth and would account for only 5 percent of job growth over the next 10 years. Similarly, other attempts to document rapid employment growth in high-technology occupations have failed.

Yet, most analysts turn to it by a process of elimination; since no other cause is evident, the residual factor is defined as technological change that particularly benefits those with more education.[54] Moreover, at a time when computer use has been sky-rocketing, there is a certain appeal to this argument.[55] Yet, Davis and Topel (1993) compare this situation to early theories about the existence of Pluto. Before this planet was discovered, astronomers said that a planet had to exist in this region of space because the orbit of Neptune would not be consistent without it.

In order to rectify this gap, a series of papers have tried to track skill-biased change across manufacturing industries (see Berman, Bound, and

[52] When the first cohorts of the baby boomers were finishing college in the early 1970s, they created a glut and drove down the earnings premium of the highly educated. At that time, many researchers wondered whether Americans were becoming overeducated (see for example Freeman, 1976).

[53] As Gottschalk and Smeeding (1997) put it: "The fact that the skill intensity increased at the same time as the skill premium increased presents a prima facie case for the importance of demand shifts." For the formal presentation of the argument and estimate of the size of the effect, see George Johnson (1997).

[54] As Gottschalk and Smeeding (1997) put it: "technological change [may be] simply a label for our ignorance."

[55] Alan Krueger showed that those who work with computers earn more than comparable workers who do not ("How Computers Have Changed the Wage Structure: Evidence from MicroData, 1984-1989"). But Dinardo and Pischke, using a German data set, cast doubt on these findings by showing that those who use pencils earn more than comparable workers who do not ("The Returns to Computer Use Revisited: Have Pencils Changed the Wage Structure Too").

Griliches, 1994; Berman, Bound, and Machin, 1997; and Autor, Katz, and Krueger, 1997). One of their definitions of skill upgrading is the change in the nonproduction worker share of the wage bill, which is justified on the basis that nonproduction workers are mostly white-collar and production workers are mostly blue-collar. Thus, office functions (in our terminology) are defined as skilled, while production functions are described as less skilled.[56]

Frankly, this is an odd definition of skill. Although office workers use computers, so do grocery checkout clerks and attendants at car rental return locations. If computer-literate users were limited to those who are adept at using many applications, this would be a small number and include many in education. Managers and sales representatives may have computers on their desks, but may do little more than word processing and E-mail. Similarly, insurance agents and real estate brokers have elaborate customer and product listings that they operate efficiently on their computers, but few could move easily to database management and spreadsheets.

The pay of business professionals and managers has increased, while the pay of professionals in technical/ scientific fields has stagnated or declined.

The common image of advanced skills is associated with workers with highly specific technical knowledge—e.g., science-related professionals and technicians. Greenwood (1997) connects skills and earnings by arguing that, during the onset of new technologies, earnings inequality increases because those able to first utilize them effectively are rewarded. Thus, if skill-biased technological change is to be more than a tautology, the earnings of scientific workers should be increasing first and the most significantly.

But results based on the new occupational groups do not find this to be the case; instead, the pay of business professionals and managers has increased, while the pay of professionals in technical/scientific fields has stagnated or declined. Managers, sales representatives, stock brokers, and the like are comprised mainly of workers with bachelor's degrees. But they do not fit the mold of high-technology information workers, and their roles have always been to coordinate and promote the activities of their firms.

The traditional approaches, based on the industrial labor model, have not focused carefully on what college graduates actually *do*.[57] It is as if skill is a continuous variable and equally relevant on the factory line and in the office. While more highly educated workers do earn more within virtually every occupation, the real basis of the large college earnings premium is their employment in managerial and professional fields that increasingly require a higher education degree to break in.[58]

By replacing industrial employment categories with a functional approach and rearranging occupations, this study attempts to clarify how the American economy has evolved over the last several decades. Using the new categories, the importance of the office sector has been high-

[56] Autor et al. (1997) further argue that computer use is correlated with the upgrading of the labor force. But they admit that their approach "misses workers who use devices with embedded microprocessors, not operated by keyboards." So once again, their measure of incorporating computer technology is connected to office workers who have terminals and PCs on their desks.

[57] One of the few treatments of this subject (Pierce, Brooks, and Finis Welch, "Changes in the Structure of Wages," in *Improving America's Schools: The Role of Incentives*) found that the changing industrial division of employment was responsible only for a small portion of the rise in the demand for college-educated labor, but that the occupational differences between workers with different levels of education were responsible for approximately two-thirds of the wage difference. However, no attempt was made to see which occupations matter most.

[58] Pryor and Schaffer use an interesting approach that combines a measure of prose, document, and quantitative skills with education. They show that university-educated workers in occupations requiring high skills are the ones who have the highest rise in earnings. Unfortunately, they do not specify which occupations these are (although they are probably the managers and business professionals that have been shown to have the largest earnings gains).

lighted as never before done: It employs the decision-makers in management, supervision, coordination, promotion, and planning.

These ownership-like functions were always a significant part of the economy and those employed in them earned well. At the turn of the 20th century, all office work (even that performed by clerical workers) was considered highly skilled because few had the writing and reading capacities required to store and retrieve business records. But most of the effort of the enterprise was directed at getting the product out the door with the most modern technique. Mass markets were starting to develop but were limited by transportation and communication capacities. As these hurdles were overcome, large scale production became possible, which permitted economies of scale and larger organizations.[59]

In the contemporary era, it has become much easier to produce and market on a global scale.

In the contemporary era, it has become much easier to produce and market on a global scale. Cheap standardized products have been replaced by more customized and style-sensitive products. The explosive growth of entertainment-driven consumption—high quality restaurants, travel, health clubs, gambling, cable and satellite television, computer games and the Internet—has changed the mix of final demand, which drives the need for different kinds of workers.[60] Heightened competition has required that firms be much more agile in terms of marketing and positioning their products.

Further, as society has gotten richer, a higher percentage of the labor force is involved in managing physical and monetary resources—currently 6.3 percent of workers are now employed in FIRE (the figure in 1959 was 4.6 percent). For prime-age workers with bachelor's degrees, the employment share rises to over 9 percent. Almost two-thirds of the "output" of these industries is directed to consumers rather than other businesses. While these are classified as services ("personal business expenses"), they are very different from those offered by physicians or cinemas.

These changes have heightened the importance of office functions and increased the number of managers and professionals. As this study shows, business professionals account for much more employment than science-based professionals. The insurance agents, real estate brokers, financial analysts, small business owners, sales representatives, accountants, and lawyers are a significant economic presence whose size as a group has not generally been appreciated.

At the same time that these positions grew in importance, the share of the labor force with bachelor's degrees grew dramatically. In fact, in the 1970s, there was concern that the public was becoming overeducated, that too many young workers had obtained higher education. But, office functions exploded and absorbed these workers who had general business skills. The few who continued to obtain M.B.A.s and law degrees were rewarded even more.

The new occupational categories used in this study were applied to check for the quality of employment, given the great concern about the number of low-paying, dead-end jobs. In the three-way summary of employment by occupation, the share in the lowest tier declined sharply, while the share of high-paying jobs rose. When the Council of Economic Advisers (CEA) released a report stating that most of the new jobs created in the 1990s were in positions that paid above the average (CEA, 1996), their results were met with skepticism because they did not tell a convincing story of what the new jobs were.[61]

[59] Business historian Alfred Chandler has carefully documented this transition and how American businessmen (more than their English and German counterparts) adapted to the advantages of mass production. See *Scale and Scope* and *The Visible Hand*.

[60] In an ensuing research report, the authors intend to pursue the issues of changing final demand and changing labor requirements in more detail.

[61] See for example, Jeff Faux (1997). "The American Model Exposed."

However, the occupational data are supported in this study by the functional analysis that shows the growth of professionals and managers in office employment.

What can one conclude from these findings? Answers are still unclear and need to be pursued further. What is certain is that labels such as *service economy* are useless if services are defined as a catchall for everything that is not directly involved in producing goods; a category that includes lawyers and waitresses is too encompassing to be meaningful. Indeed, services come in too many forms to be of any analytic benefit, and office functions should not be classified as services.

Labels such as *service economy* are useless if services are defined as a catchall for everything that is not directly involved producing goods.

Further, the label *information economy* is equally unrevealing; it is, again, too broad, because every job involves conception before execution. Many researchers have shown that even assembly line workers have developed a large base of knowledge to deal with unexpected situations and machinery malfunctions. Thus, it is difficult to distinguish who the information workers are. If the definition includes anyone working with computers or microprocessors, then few workers would be excluded.

Similarly, the term *high-tech workers* should be avoided unless it is defined narrowly to mean science-based professionals and technicians, since high-tech is not synonymous with professional or college-educated. Too many researchers make this connection because it is easy and is connected with rising economic inequality. However, it is important to explore more deeply what workers *do* to determine the causes of recent labor-market developments.

As this study demonstrates, the workers who are most closely identified with specialized high-tech skills have not been the ones whose paychecks have risen. Instead, it is the managers, lawyers, medical doctors, and other business professionals who have caused the earnings of college-educated males to increase. In cases where these highly educated workers do not obtain elite jobs, their earnings have declined and were lower in 1995 than managers and professionals with just high school diplomas. Further, the declining pay of males with some college and high school diplomas can be traced to their lowered ability to get elite jobs and to lower earnings in blue-collar jobs (crafts, operators, and laborers). In industrial settings where productivity advances have been the greatest, fewer workers are required and the remaining workers are easier to replace; hence, their wages have fallen. By contrast, the leaders of business enterprises have set up new compensation schemes that reward managers and professionals more handsomely. Frank and Cook (1996) highlight the large compensation percentages of CEOs, entertainers, and others and describe the new rules as "winner takes all."

But the larger point is that business executives have become more crucial than ever. The temptation might be to think that this is an irrational or unproductive way of ordering an economy. It could be that the public would be better served if companies did not compete this way, but no firm feels it can cut back without potentially losing market share (a kind of prisoners' dilemma). Or, it is possible that these business professionals provide important contributions in satisfying consumer desires for quality, variety, customization, and convenience.

The current economic structure is based on technological advances that have made production easier, integrated markets globally, cheapened communications, relied heavily on advertisement-driven consumption, and increased the amount of business data available to decision-makers.[62]

[62] These changes have important consequences for productivity, international comparison, and trade issues, and the authors intend to develop these themes in later works.

The result is that office functions have become the dominant activity in the economy, accounting for 41 percent of the jobs, almost 60 percent of those with bachelor's degrees, 50 percent of the earnings, and most of the job growth in the last two decades. Given the recent emphasis on the importance of technology and the information revolution, this was not the expected conclusion. But, once the approach presented here redefined industries into functional categories and occupations into more consistent groupings, the Office Economy emerged larger than ever.

Appendix: Data Sources and Methodology

The data are derived from the March Annual Demographic files of the Current Population Survey (CPS) for 1970, 1980, 1990, and 1996, and the Public Use Microdata Sample (PUMS) of the 1960 Census. The March CPS surveys ask questions about the previous year so the information in the 1996 CPS refers to 1995 (and is presented as such in this study). The surveys consist of approximately 60,000 households, although this study tracks only non-military persons 16 years and older with positive employment hours and earnings. Hours worked are computed by multiplying usual hours worked times the number of weeks worked, while annual labor market earnings, including self-employment income, are converted to constant 1996 dollars using the CPI-U-X1. Occupations and industry worked are based on the survey questions on the longest job held. Consequently, multi-job holders and people with more than one job in a year are not allocated correctly if their secondary jobs were not in the same occupation as their primary one. Like other researchers, we deem the resulting error to be small and inconsequential. For the 1960 PUMS, the industry and occupation data are based on current employment, although earnings refer to the previous year.

The self-employed create unusual problems for this analysis. On the one hand, almost 40 percent of them report either negative earnings or missing data on hours, causing them to be dropped from our calculations. Since the source of this negative earnings is the result of business losses, it seems appropriate to exclude these results from the labor market analysis. Further, many self-employed are the main workers of their businesses so it is not immediately clear how to incorporate them into the functional analysis. The decision rule used here was to treat those who gave their occupation as managers and professionals identically with those who were not self-employed. However, for those whose occupation was in the good and less-skilled job categories, they were treated as supervisors, which meant that they were allocated half to the managerial function and half to direct work of the industry they were employed in.

In terms of occupations, Appendix Table A-1 presents the allocation of the official 500 3-Digit codes among our 21 categories. We have discussed in the text several differences between our approach and the official code. A few more differences need to be reported:

1. The educational attainment and earnings of supervisors and proprietors in sales occupations (code 243) were very similar to other managers, so they were classified as managers. However, this enlarged managers' category was stripped of all those who worked in retail trade (industries 580-691) and low-skilled business, repair, recreational, and personal services (721-810). These workers had average earnings only slightly more than half that of other managers, and they were grouped with supervisors.

2. Pilots (226) are officially classified as technicians even though their earnings are much higher; in our approach, they are included with science-related professionals.

3. Accountants and other management-related professionals are included as business professionals.

4. Sales representatives, stock and real estate brokers, and insurance agents are also put in the business professionals category.

5. Blue-collar supervisors include railroad engineers and ship captains.

Unfortunately, creating consistent occupational divisions is not easy because of the multiple changes in the last 36 years. The Census Bureau has produced two technical papers documenting how the different coding schemes align. In most, but not all, cases there is a direct link between codes in different years. As other researchers have

done, the authors have used these advisories to match up occupational codes in different years.[63]

Next, a few words need to be added about educational attainment. In all of the data prior to 1993, the survey only asked about years of schooling completed. Those with exactly 12 years were assumed to be high school graduates while those with greater than 16 years were assumed to have completed their four-year degree. Following 1993, more detailed questions were asked of respondents about degree completion. Therefore, there is no strict conformism of the last data point with the previous ones. Again, the consensus view among researchers doing multi-year comparisons is that no unusual biases are added by this difference.

In terms of functions, the five-part scheme reported here is based on a more detailed analysis of 15 sub-functions:

F1: Extraction production in agriculture, mining, fishing, and lumber
F2: High-wage manufacturing (average production worker earnings higher than $25,000)
F3: Low-wage manufacturing
F4: Industrial production in public utilities, construction, and transportation
F5: Personal services
F6: Retail services
F7: Health care
F8: Education
F9: Police and firefighting
F10: Transportation and communication for personal consumption
F11: Managers and half of supervisors
F12: FIRE
F13: Business professionals
F14: Clerical and support labor
F15: Public administration and non-profit

Finally, CPS-reported earnings are "top-coded" to prevent possible disclosure of individual respondents. In the years prior to 1996, the maximum earnings were set at $100,000 or lower in nominal (not inflation-adjusted) dollars. However, in 1996, the Census Bureau decided not to use a strict top-code but used an allocation procedure for earnings

Table A-1
Allocation of 1996 Official Occupational Codes into 21 Categories

Occupational Category	Codes
1A. Manager	004-022, 243 (except for those in industries 580-691, and 721-810)
1B. Lawyers/Judges	178
1C. Health Diagnostic Professionals	083-089
2A. Accountants and Other Management-Related Occupations	023-037
2B. Sales Representatives and Brokers	253-259
2C. Science-Related Professional	043-079, 226
3A. Other Health Professionals	095-106
3B. Teachers	113-163
3C. Arts and Letters Professionals	164-177, 183-199
4A. Line Supervisors	004-022, 243 in industries 580-691, and 721-810
4B. Blue-Collar Supervisors	503,553-558, 613, 628, 803, 843 and self-employed workers in all occupations below this point
4C. Farm Owners and Managers	473-476
5A. Technicians	203-225, 227-235
5B. Crafts and Repair	494, 505-549, 563-599, 614-617, 634-699, 823-826, 828
5C. Police and Firefighters	413-424
6A. Clerical and Administrative Support	303-389
7A. Operatives	483-489, 495-99, 703-799, 804-14, 829-34, 844-59
8A. Salesclerks	263-285
8B. Service Workers	403-07, 425-427, 433-469
8C. Laborer and Helpers	864-889
8D. Farm Workers	477-479

[63] The specific allocation coding for other years is available from the authors.

over $100,000, permitting reported earnings to rise to over $500,000. This change in procedure raises several problems for making historical comparisons, especially since these very high-earners are concentrated among managers and professionals.

The challenge is to use a methodology that tries to maintain consistency over the 36 years of the study but that does not neglect the success of high-earners in recent years. The change in the top-code level turns out to be not that significant because the rate of inflation makes the cut-off level almost equal to the exception of 1996. The amount of earners above the top-code does change. Up until 1980, at most 0.3 percent of earners were top-coded. This figure rose to 0.8 percent in 1990 and to 1.8 percent above $100,000 in 1996. A closer examination of the 1996 earnings data shows that approximately 0.8 percent of earners were listed with over $200,000, and this level was chosen as a maximum earnings level for this year.

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